

Docket No.: CL001010  
Serial No.: 09/776,705  
Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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```
1 CCATTCCAAA CAAGTCAGGA AAGCCTGCAC AGGACTGGAT AAATAATTAA
51 GAACAGAGTG TTCTGAACAT CAACACAAG TGGAAGAACC TTAAGCTGAA
101 GGTACAGTAT ATTATTTTACA CTGAAGGGGC TTGTGTGTGG ACAAGAAAGC
151 GCTGACAGCT CAAATGGATC CCATGGAAC TGAAGATGTC AACATCGAAC
201 CAGATGATGA GAGCAGCAGT GGAGAAAGTG CTCCAGATAG CTACATCAGG
251 ATAGGAAATT CAGAAAAGGC AGCAATGAGC AGTCAATTTC CTAATGAAGA
301 CACTGAAAGT CAGAAATTCC TGACAAATGG ATTTTGTGGG AAAAAGAAGC
351 TGGCAGATTA TGCTGATGAA CACCATCCCG GAACCACTTC CTTTGGAAATG
401 TCTTCATTTA ACCTGAGTAA TGCCATCATG GGCAGTGGGA TCCTGGGCTT
451 GTCTATGCC ATGGCCTACA CAGGGGTCAT ACTTTTATA ATCATGCTGC
501 TTGCTGTGGC AATATTTATCA CTGTATTTCG TTCACCTTTT ATTAAAAACA
551 GCCAAGGAAG GAGGGTCTTT GATTTATGAA AAATTAGGAG AAAAGGCATT
601 TGGATGGCCG GGAAAAATTG GAGCTTTTGT TTCCATTACA ATGCAGACA
651 TTGGAGCAAT GTCAAGCTAC CTCCTTATCA TTAAATATGA ACTACCTGAA
701 GTAATCAGAG CATTTCATGG ACTTGAAGAA AATACTGGAG AATGGTACCT
751 CAATGGCAAC TACCTCATCA TATTTGTGTC TGTGGAAAT ATTCTTCCAC
801 TTTCGCTCCT TAAAAATTTA GGTATCTCTG GCTATACCAG TGGATTTTCT
851 CTACCTGCA TGGTGTTTT TGTAGTGTG GTGATTTACA AGAAATTCCA
901 AATACCTGC CCTCTACCTG TTTTGGATCA CAGTGTGGA AATCTGTCTAT
951 TCAACAACAC GCTTCCAATG CATGTGGTAA TGTTACCCAA CAACTCTGAG
1001 AGTTCGTATG TGAACCTCAT GATGGATTAC ACCCACCGCA ATCCTGCAGG
1051 GCTGGATGAG AACCAGGCCA AGGGCTCTCT TCATGACAGT GGAGTAGAAT
1101 ATGAAGCTCA TAGTGATGAC AAGTGTAAC CCAAACTACT TGTATTCAAC
1151 TCCCGGACGG CCTATGCAAT TCCTATCCTA GTATTTGCTT TTGTATGCCA
1201 CCTGAGGTC CTTCOCATCT ACAGTGAAC TAAAGATCGG TCCCGGAGAA
1251 AAATGCAAAAC GGGTGCAAAAT ATTTCCATCA CGGGATGCT TGTATGTATC
1301 CTGCTTGCCG CCTCTTTGG TTACCTAACC TTCTATGGAG AAGTTGAAGA
1351 TGAATTACTT CATGCCCTACA GCAAAGTGTG TACATTAGAC ATCCCTCTTC
1401 TCATGGTTGG CCTGGCAGTC CTGTGGCAG TAACACAAAC TGTGCCCATT
1451 GTCTCTTCC CAATTCGTAC ATCAGTGATC AACTGTATT TCCCAAAGG
1501 ACCCTTCAGC TGGATACGAC ATTTCCCTGAT TGCAGCTGTG CTATTTGCAC
1551 TTAATAATGT TCTGGTATC CTGTGGCCAA CTATAAAATA CATCTTCGGA
1601 TTCATAGGGG CTCTCTCTGC CACTATGCTG ATTTTATATC TTCCAGCAGT
1651 TTTTATCTTT AAACCTGTGA AGAAAGAAAC TTTTAGGTCA CCCCAAAAGG
1701 TGGGGCTTTT AATTTTCTTT GTGGTTGGAA TATTCCTCAT GATTGGAAGC
1751 ATGGCACTCA TTATAATTGA CTGGATTTAT GATCTCCCAA ATTCCAAGCA
1801 TCACTAACAC AAGGAAAAAT AC (SEQ ID NO:1)
```

**FEATURES:**

5'UTR: 1-163  
Start Codon: 164  
Stop Codon: 1805  
3'UTR: 1808

FIGURE 1A



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**HOMOLOGOUS PROTEINS:**

Top BLAST Hits:

	Score	E
CRA 145000039337444 /altid=gi 12017941 /def=gb AAG45335.1 AF295...	975	0.0
CRA 114000033649823 /altid=gi 10945621 /def=gb AAG24618.1 AF298...	597	e-169
CRA 160000003782430 /altid=gi 8677401 /def=gb AAF75589.2 AF1736...	591	e-168
CRA 148000002720069 /altid=gi 8248427 /def=gb AAF74195.1 AF2496...	587	e-166
CRA 87000000006802 /altid=gi 7243145 /def=dbj BAA92620.1  (AB03...	578	e-164
CRA 18000005069115 /altid=gi 5870893 /def=ref NP_006832.1  tran...	500	e-140
CRA 88000001154721 /altid=gi 7406950 /def=gb AAF61849.1 AF15985...	496	e-139
CRA 66000019404613 /altid=gi 9506837 /def=ref NP_061849.1  amin...	495	e-139
CRA 100000004435450 /altid=gi 8926332 /def=gb AAF81797.1 AF2730...	492	e-138
CRA 335001098689635 /altid=gi 11434147 /def=ref XP_006635.1  hy...	480	e-134

EST:

gi 10934204 /dataset=dbest /taxon=96...	1072	0.0
gi 10286121 /dataset=dbest /taxon=96...	718	0.0
gi 9872634 /dataset=dbest /taxon=960...	680	0.0
gi 2656674 /dataset=dbest /taxon=9606 ...	549	e-154
gi 9882497 /dataset=dbest /taxon=960...	541	e-151
gi 689641 /dataset=dbest /taxon=9606 /...	525	e-147

**EXPRESSION INFORMATION FOR MODULATORY USE:**

library source:

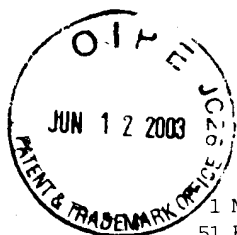
Expression information from BLAST dbEST hits:

gi|10934204 Whole embryo (mainly head)  
gi|10286121 Hepatocellular carcinoma  
gi|9872634 Non-cancerous liver  
gi|2656674 Fetal liver spleen  
gi|9882497 Non cancerous liver  
gi|689641 Liver

Expression information from PCR-based tissue screening panels:

Mixed tissue (Brain, Heart, Kidney, Lung, Spleen, Testis, Leukocyte)

FIGURE 1B



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1 MDPMELRNVN IEPDDESSSG ESAPDSYIRI GNSEKAAMSS QFANEDTESQ  
51 KFLINGFLGK KKLADYADEH HPGITTSFGMS SFNLSNAIMG SGILGLSYAM  
101 AYTGVILFII MLLAVAILSL YSVHLLKTA KBGGSLLIYEK LGEKAFGWPG  
151 KIGAFVSIIM QNIGAMSSYL FLIKVELPEV IRAFMGLEEN TGEWYINGNY  
201 LIIFVSVGII LPLSLKKNLG YLGYTSGFSL TCMVFFVSVV IYKKFQIPCP  
251 LPVLDSHVGK LSFNNILPMH VMPLPNSES SDVNFMDYT HRNPAGLDEN  
301 QAKGSLHDSG VEYEAHSDDK CEPKYFVENS RTAYAIPILV FAFVCHPEVL  
351 PIYSELKDRS RRRMQIVSNI SITGMLVMYL LAALFGYLTG YGEVEDELLH  
401 AYSKVYILDI PLIMVRLAVL VAVTQTVPIV LFPVRTSVIT LLFPRKPPSW  
451 IRHFLIAAVL IALNNVLVIL VPTIKYIFGF IGASSATMLI FILPAVFYLK  
501 LVKKETFRSP QKVGALIFLV VGIFFMIGSM ALIITDWTYD PPNKSHH (SEQ ID NO:2)

**FEATURES:**

**Functional domains and key regions:**

[1] PDOC00001 PS00001 ASN\_GLYCOSYLATION  
N-glycosylation site

Number of matches: 5

- 1 83-86 NLSN (SEQ ID NO:6)
- 2 260-263 NLSF (SEQ ID NO:7)
- 3 264-267 NNTL (SEQ ID NO:8)
- 4 276-279 NNSE (SEQ ID NO:9)
- 5 369-372 NISI (SEQ ID NO:10)

[2] PDOC00004 PS00004 CAMP\_PHOSPHO\_SITE  
cAMP- and cGMP-dependent protein kinase phosphorylation site

503-506 KKET (SEQ ID NO:11)

[3] PDOC00005 PS00005 PKC\_PHOSPHO\_SITE  
Protein kinase C phosphorylation site

Number of matches: 7

- 1 33-35 SEK
- 2 49-51 SQK
- 3 129-131 TAK
- 4 290-292 THR
- 5 360-362 SRR
- 6 473-475 TIK
- 7 506-508 TFR

[4] PDOC00006 PS00006 CK2\_PHOSPHO\_SITE  
Casein kinase II phosphorylation site

Number of matches: 5

- 1 18-21 SSGE (SEQ ID NO:12)
- 2 22-25 SAPD (SEQ ID NO:13)
- 3 129-132 TAKE (SEQ ID NO:14)
- 4 305-308 SLHD (SEQ ID NO:15)
- 5 309-312 SGVE (SEQ ID NO:16)

FIGURE 2A



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[5] PDOC00008 PS00008 MYRISTYL  
N-myristoylation site

Number of matches: 6

- 1 95-100 GLSYAM (SEQ ID NO:17)
- 2 153-158 GAFVSI (SEQ ID NO:18)
- 3 164-169 GAMSSY (SEQ ID NO:19)
- 4 186-191 GLEENT (SEQ ID NO:20)
- 5 296-301 GLDENQ (SEQ ID NO:21)
- 6 482-487 GASSAT (SEQ ID NO:22)

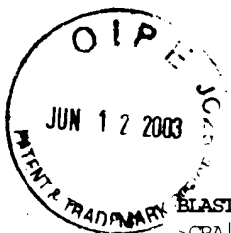
[6] PDOC00009 PS00009 AMIDATION  
Amidation site

58-61 LGKK (SEQ ID NO:23)

Membrane spanning structure and domains:

Helix	Begin	End	Score	Certainty
1	79	99	1.125	Certain
2	102	122	2.503	Certain
3	153	173	1.197	Certain
4	197	217	1.785	Certain
5	222	242	2.123	Certain
6	332	352	1.240	Certain
7	370	390	2.166	Certain
8	414	434	1.301	Certain
9	453	473	1.520	Certain
10	476	496	2.166	Certain
11	515	535	2.628	Certain

FIGURE 2B



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BLAST Alignment to Top Hit:

```
>CRA|145000039337444 /altid=gi|12017941
/def=gb|AAG45335.1|AF295535_1 (AF295535) amino acid
transport system A3 [Rattus norvegicus] /org=Rattus
norvegicus /taxon=10116 /dataset=nraa /length=547
Length = 547

Score = 975 bits (2492), Expect = 0.0
Identities = 478/547 (87%), Positives = 508/547 (92%)

Query: 1 MDPMELRNVNIEPDESSSGESAPDSYIRIGNSEKAAMSSQFANEDTESQKFLINGFLGK 60
MDP+ELR+VNIEP ++S S +S Y +GNSEK AM SQFANED ESQKFLINGFLGK
Sbjct: 1 MDPIELRSVNIEPYEDSCSVDSIQSCYTGNGNSEKGAMDSQFANEDAESQKFLINGFLGK 60

Query: 61 KKLADYADEHHPGTTSFGMSSFNLSNAIMSGILGLSYAMAYTGVILFIIMLLAVAILSL 120
K L DYADEHHPGTTSFGMSSFNLSNAIMSGILGLSYAMA TG++LF+IMLL VAILSL
Sbjct: 61 KTLIDYADEHHPGTTSFGMSSFNLSNAIMSGILGLSYAMANTGIVLFFVIMLLIVAILSL 120

Query: 121 YSVHLLLTAKBGGSLIYEKLGKAFGWPGKIGAFVSITMQNIGAMSSYLFIIKYELPEV 180
YSVHLLLTAKBGGSLIYEKLGKAFGWPGKIGAF+SITMQNIGAMSSYLFIIKYELPEV
Sbjct: 121 YSVHLLLTAKBGGSLIYEKLGKAFGWPGKIGAFISITMQNIGAMSSYLFIIKYELPEV 180

Query: 181 IRAPMGLEENTGEWYINGNYLIIFVSVGIILPLSLKLNGLGYLGYTSGFSLTOMVFFVSV 240
IR FMGLEENTGEWYINGNYL++FVSVGIILPLSLKLNGLGYLGYTSGFSLTOMVFFVSV
Sbjct: 181 IRVFMGLEENTGEWYINGNYLVLFVSVGIILPLSLKLNGLGYLGYTSGFSLTOMVFFVSV 240

Query: 241 IYKGFQIPCPFLVLDHSGNLSFNNTLPMHVVMLPNNSESDVNFMDYTHRNPAGLDEN 300
IYKGFQIPCPFLVLDH+ GNL+FNNTLPMHV+MLPNNSES+ +NFM+DYTHR+P GLDE
Sbjct: 241 IYKGFQIPCPFLVLDHNGNLTFNNTLPMHVIMLPNNSESTGMNFMVDYTHRDPEGLDEK 300

Query: 301 QAKGSLHDGSGVEYEAHSDDKCEPKYFVFNSTAYAIPIILVFAFVCHPEVLPITYSELKDRS 360
A G LH SGVEYEAHS DKC+PKYFVFNSTAYAIPIIL FAFVCHPEVLPITYSELKDRS
Sbjct: 301 PAAGPLHGSGVEYEAHSGDKCQPKYFVFNSTAYAIPIILAFVCHPEVLPITYSELKDRS 360

Query: 361 RRRMQIVSNISITGMLVMYLLAALFGYLTFYGEVEDELLHAYSKVYTIDIPILMVRLAVL 420
RRRMQIVSNISITGMLVMYLLAALFGYL+FYGEVEDELLHAYSKVYT D LLMVRLAVL
Sbjct: 361 RRRMQIVSNISITGMLVMYLLAALFGYLSFYGEVEDELLHAYSKVYTFDTALIMVRLAVL 420

Query: 421 VAVTQIVPIVLFPIRISVITLLEFPKRPFWSWIRHFLIAAVLIAANNVLVILVPTIKYIFGF 480
VAVT TVPIVLFPIRISVITLLEFP+RPFSW++HF IAA++IALNNVLVILVPTIKYIFGF
Sbjct: 421 VAVILTIVPIVLFPIRISVITLLEFPRRPFWSWKHFGIAAIIIALNNVLVILVPTIKYIFGF 480

Query: 481 IGASSATMLIFILPAVFYKLKVKETFRSPQKVGALIFLVVGIFFMIGSMALIIIDWIYD 540
IGASSATMLIFILPA FYLKLKKE RSPQK+GAL+FLV GI FM+GSMALIIIDWIY+
Sbjct: 481 IGASSATMLIFILPAAFYKLKVKKEPLRSPQKIGALVFLVTGIIIFMIGSMALIIIDWTYN 540

Query: 541 PPNKHH 547 (RESIDUES OF 1-547 OF SEQ ID NO:2)
PPN HH
Sbjct: 541 PPNPDH 547 (SEQ ID NO :4)
```

```
>CRA|114000033649823 /altid=gi|10945621
/def=gb|AAG24618.1|AF298897_1 (AF298897) amino acid
transporter system A [Homo sapiens] /org=Homo sapiens
/taxon=9606 /dataset=nraa /length=506
Length = 506

Score = 597 bits (1522), Expect = e-169
Identities = 315/549 (57%), Positives = 383/549 (69%), Gaps = 46/549 (8%)

Query: 1 MDPMELRNVNIEPDESSSGESAPD---SYIRIGNSEKAAMSSQFANEDTESQKFLINGF 57
M E+ +I PD++SSS S D SY +++AA+ S +A+ D E+Q FL
Sbjct: 1 MKKAEMGRFSISPDESSSYSSNSDFNYSY----PTKQAALKSHYADVDPENQNFLESN 56
```

FIGURE 2C



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Query: 58 LGKKKLADYADEHHPGTTSPGMSFNLSNAIMSGGILGLSYAMAYTGVLFIIMLLAVAI 117  
LGKKK Y E HPGTTSPGMS FNLSNAI+GGGILGLSYAMA TG+ LFII+L V+I  
Sbjct: 57 LGKKK---YETEFHPGTTSPGMSVFNLSNAIVSGGILGLSYAMANTGIALFIILLTFVSI 113

Query: 118 LSLYSVHLLLLKTAKEGGSLIYEKLGKAFGWPGKIGAFVSITMQNIGAMSSYLFIKYL 177  
SLYSVHLLLLKTA EGGSL+YE+LG KAFG GK+ A SITMQNIGAMSSYLFI+KYL  
Sbjct: 114 FSLYSVHLLLLKTANEGGSLLYBQLGYKAFGLVGKLAASGSITMQNIGAMSSYLFIKYL 173

Query: 178 PEVIRAFMGLLENTGEWYNGNYLIIFVSVGIILPLSLKNLGYLGYTSGFSLTOMVFFV 237  
P VI+A +E+ TG WYNGNYL++ VS+ +ILPLSL +NLGYLGYTSG SL CMVFF+  
Sbjct: 174 PLVIQALINIEDKTGLWYNGNYLVLLVSLVILPLSLFRNLGYLGYTSGLSLLCMVFFL 233

Query: 238 SVWIYKKFQIPCLPVLVDHSGNLSFNNTLPMHVMLPNNSESSDVNFMMDYTHRNPAQL 297  
WVI KFKQ+PCP+ + N + N TL ++P  
Sbjct: 234 IWVICKKFQVPCPVEAA--LIINETINTLTQTALVP----- 269

Query: 298 DENQAKGSLHDSGVEYEAHSDDKCEPKYFVFNSTAYAIPILVFAFVCHPEVLPIYSELK 357  
+ + +D C P YF+FNS+T YA+PIL+F+VCHP VLPY ELK  
Sbjct: 270 -----ALSHNVTEHDSRPHYFIENSQTVAVPILIFSFCVCHPAVLPIYEELK 317

Query: 358 DRSRRKMQTVSNISITGMLVMYLLAALFGYLTFYGEVEDELLHAYSKVYTLDIPLIMVRL 417  
DRSRR+M VS IS M +MYLLAALFGYLTFY VE ELLH YS + DI LL+VRL  
Sbjct: 318 DRSRRRMNVSKISFFAMFLMYLLAALFGYLTFYEHVESELLHTYSSILGIDILLIVRL 377

Query: 418 AVLVAVTQTVPIVLFPIRISVITLLFPKRPFWSIRHFLIAAVLIAANNVLVILVPTIKYI 477  
AVL+AVT TVP+V+FPPIR+SV LL + FSW RH LI ++A N+LVI VPTI+ I  
Sbjct: 378 AVLMAVTLTVPVVIFPIRSSVIHLLCASKDFSWRHSLITVSILAFINLLVIFVPTIRDI 437

Query: 478 FGFIGASSAIMLIFILPAVFYKLKVKETFRSPQKVGALIFLVGIFFMIGSMALIIDW 537  
FGFIGAS+A+MLIFILP+ FY+KLVKKE +S QK+GAL FL+ G+ M GSMALI++DW  
Sbjct: 438 FGFIGASAASMLIFILPSAFYIKLVKKEPMKSVQKIGALFFLLSGVLWMTGSMALIVLDW 497

Query: 538 IYDPFNSKH 546 (RESIDUES OF 1-546 OF SEQ ID NO:2)  
+++ P H  
Sbjct: 498 VHNAPGGGH 506 (SEQ ID NO :5)

**Hmmer search results (Pfam):**

Model	Description	Score	E-value	N
PF01490	Transmembrane amino acid transporter protein	187.0	2.9e-52	2
CE00398	E00398 CD53	4.0	4.8	1

**Parsed for domains:**

Model	Domain	seq-f	seq-t	hmm-f	hmm-t	score	E-value
CE00398	1/1	90	110 ..	1	23 [.	4.0	4.8
PF01490	1/2	99	236 ..	1	179 [.	58.9	2.5e-14
PF01490	2/2	305	529 ..	200	467 .]	133.9	3e-36

FIGURE 2D



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1 AGCTTAGCAA TATGGATCAA GAGGTCCAAT ACCTGATTAA TAAAAGTTTC  
51 AGGAGTAAAC AAAGGGGAAG AAATAGTTTT TTTAAATAGT AGAAGCTTTTT  
101 TTATTTTTAG AAAATGTGTC TTCTATAGAA GAAAGACAAG CCTTTTGATT  
151 GGGCCGTCCT CATGCTGAGT ATGATGAATT TTAAGGCGA CTCACATCTA  
201 GTACCGTCGT GATGAAAGGA TAAGGATAAA AATTCTGAAA TCCTCAGAAA  
251 ACCATCGATA AATTATCTAT AAAGAAATAA GAGCCAGACT CATCAATAGA  
301 AGCTAGAAGA GAGAAGTTTC TTCAATATTC TGAAGGAAAA TGCTTCGAA  
351 TCTAGAATTC AAACAATTAA CAAAGTTTGA AGGCCAAAATA AAGAATTTTC  
401 CAACATGAAG CAACTCAGAA ATTCTATTTA CAGACATAGG CTCATTGTGT  
451 GAAAAAGATT ATTCAAGGCA TTATTTTAGC ATAATGCAA ATAAACTGAA  
501 GAAAGAAGAT AGAATGCCGT TCAAGAACT AGCAGCTGAG CAAGACTCAG  
551 AGGTTGGAGG AGGAAGCCAT TCAGAATGAG AAAGAGCATA GAAAATTTGC  
601 TTTCAGAGTT TTGGTAATAT AGAATTATAT TTCATTATT ATGTAGTCAA  
651 ATACACCACT TTGTCTTTAG GGCATACTAT TTATACAGTG ATAATACTGT  
701 AATTGCTGCT TATTGGTTTT CCATGTTTAG AAACAACCTA CAGGCAAGTT  
751 ATGACACTTG TTTCACAGAA CAAGATGAAA ATATTATGAT TCTCAAAITG  
801 TAAAAGTATT TTATTAACTA AAATAATTAG GAGTGTAGGA GAAGGAAGGA  
851 AAGAAAGAAA AAGTATGCTA ATGTCTTAT TTTTATGGG TAACAGTCT  
901 AAAATCAGTA AACCAAGTCA AAAAAGCTTT AGTGAATTAT TCAGATCTAG  
951 AATGGCTAAC TTTAAGTAA CAGCTAAAAA CAGAAACCGT CAATAGTGGT  
1001 TGCTGCTGGG AAGTGAGACT GGTACTGTGT GAAGAATGAG GAAAACCTTT  
1051 GTACTCATTT AGTGAGTTTC TTTTTTTTTT CTTTTACCA TATGCATGTC  
1101 TTACTTCTAT TCTCTCTTAG CTTTTAACCT GCTTCTTTTC ATCTTTTATG  
1151 TATATACATT TAGGCTGCTT TATATTAAATA ATAGTTTCAT TTTTGTCTT  
1201 CCTGCTTAAA ACACGTGTGT CTATTTTTTT AAATTCCTGAG AACTGCTTTC  
1251 TTATTTTCTA GACAATTCTC TGCCATTATC TCTTTCTGTT TTGTCTCACC  
1301 CTAGTCTCAC AATTCTCTAT ATTGGAATGA CTATCAGTGT ATATTGAAC  
1351 TTGTAATCTT TATTTTTTCC CCATTCTCTT TAACCTCTTA TTGTATTTT  
1401 TCTTTTTTTA ATCTCTTCAT GCTATAATT GAGTGATTTC CACAGATCTG  
1451 TCTTTCAATT TTATAAGTCT TCCTTCAGCT GAGTTTTTTT AAATTTCAAT  
1501 GATTCTATTT TTTTCTTTTT TTTAAGAATT CCTTTTTTTG ACTCTTTTTG  
1551 CAACAGCCTG TCTCTCTTTT ATATTCTTTT ATAATGTTTT TATTCTGIGA  
1601 AAGTTATCTT CTATTTTGA ATGTTTTCTT TCAAAATGTC TTTCTTTTTA  
1651 TTAATTTAAT GTAAAAGTCC CTTTTAAATT GCTTTGTAT TTGTAGTTCC  
1701 TTAGATGIGA ATTTTATCAT TTCTTGIGCC TACTGGCACT CTGTCTAGTG  
1751 AGTTTCCATG TGTTTCTTAT ATGTTTTGTA ATTTGAGGAT GTGAACITTT  
1801 CTCAGTGIGT AGTTGCCCTT CAAAAAGTA CTGCCATGGC ACTGGGTGT  
1851 GGAGGTATTC CCATGTGGTA GTTTCTGTTT GTGAGAGGAA TAGCACATTT  
1901 TGTGACTTCT GGAGCAATTT TTATGTTAGT TTCTCTGCTC AAGATTTCTT  
1951 TATCAAAATG GTATTGCACA TGTATGACC AACTTTTTCA AGAATGATAG  
2001 TGTTTCTCTT AATACGATGG TTCAACAATA ATTGAAATGA TCTAATGGTA  
2051 AGAATTTTCA AAGAAATTAT ATCAACTACA TATAGTAGAT TCAAGGCATT  
2101 TTTCAAAAAC ACAATGCCAG TCCACCCCTT TTCATTATAC AATTGAGGAA  
2151 AATGAGGTCC CCAAATGTTA AATGACTTCT GCTGAGATCC AATGAATTAA  
2201 AGGCAGAGCA GAGGCTAAAA TCTAGATCTC TTTGTGTGTA AAATACATTT  
2251 TAATTTGACA CAGATGATGA GTAAATGCTA CCCAGAGGTA AATCTGAAC  
2301 TTCTTTTGT ACTATCTTCA ACTTTGGCTT CAGGATCCAA GTGCTAGAA  
2351 AGTTACTTCC TAAACTTGAT CCTCACCTAT GTTGCAATT ATCAAGCAIT  
2401 TGGTGGTGT AATTCTTTCA TGTCCAATTA AATTAAAGCA GTAATTTTCT  
2451 TTCTAGTTAT TGCTAGTAGA GACACTGGTA GATTCTGCTT TGGTAGACCT  
2501 TCCTCTGTA ACAATTTACT TTTGTCTTCC TTCTTTTAA AACATGTATC  
2551 CCACTCACA ATACCTAAAT TTCTTTGAAG ACTGCTGCCA TGTTTTAAGA  
2601 TTTCTTTTTT TTTCATAGT GACTAGTAAA ACCTGCCATT TTCAATTATC  
2651 ATAGGCATC TATAAATATC TGCTAATTTA GCAATTATTA GTAATTTCTT  
2701 TTCTTCTCTT CCATTTCTTC CTTTCTGTGA TTGGGTAAAG GAACATTTCA  
2751 GGATTTGCTT ATGTAAAGTT TTCAGGAGTT TCTTTCTTTC CTCCCTTTTA  
2801 CAGAGAGCAT ACAAATGTA GATGATTCAT ATTCATTAT TTCAATTTAAA  
2851 TAAAATTATA ATGATGTATG TTGTGTTCTG TTTGCAGAAC AGAGTGTCT  
2901 GACATCAAC ACAAGGTGA AGAACCTTAA GCTGAAGGTA CAGTATATTA  
2951 TTACACTGA AGGGCTTGT GTGTGGACAA GAAAGCGCTG ACAGCTCAAA  
3001 TGGATCCCAT GGAATGAGA AATGTCAACA TCGAACGAGA TGATGAGAGC  
3051 AGCAGTGGAG AAAGTCTCC AGATAGCTAC ATCGGATAG GAAATTCAGA  
3101 AAAGCAGCA ATGAGCAGGT ATGGGGTTAA AAATTACTAT GTTCCATGGA

FIGURE 3A



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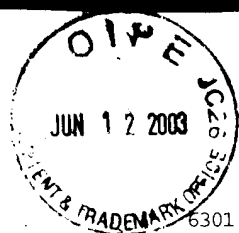
Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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3151 AAAATAAGAC AGGATGTGGA CATGGAAAAC AGGGTCTTGA TGGGAAGAAC  
3201 TGGATTATAT ACAGGTAAAT TTGTGATAAC AATGATATTG ATGCTAGCAC  
3251 ATCAATTCCC TGGTCCGTAA ATACAGTGAT AATGTCAATC TCTTTTGTGA  
3301 CTGATTTAGA ATTGAGGTTA CAATGTCTTT GTCTCCAITA ATAATGTGTA  
3351 ATAATTTTAA TTATTTTAGC CTATGTCTCC TCTTATCTTT CTCAGATTCC  
3401 TCTTTGAATG TTGCTACACC TCTTGGTTTC TGTAGGGATT CTTTCTCTC  
3451 TAAAAGTATC CTCTGGGCAA GCTCACTCAC AACTACTATG GCCTCACCCCT  
3501 CCAAATATAT GCCATATACC CAGCCTGTGA AGTTTCTCTA CTGAATTTCA  
3551 GATAATTATA TCTGAATGTC TACTGCACGT CTCTACTGGA CCATTACTGT  
3601 GTCTAAATTG CCTCATTTAT AAAGTTAAAC CTGTAATGTC TAATACTGAA  
3651 CTCTATCTTT TCCCTCCAAA ACCTGTCTCT CCTCTAGTAA TCCCATCCT  
3701 AGTGAATAAC ACTGCTATCA TGTAGCAACT CACTCAAAAG CCCCTAGGTG  
3751 TAAACTTTGA CCCACATAGC CAACGGTCAG TCATATCCAG TTGGTTTGAC  
3801 CTATTTAATG CTTCAAATAC ACCTACTTTT CTGTACCCAT TCTACTGTGG  
3851 TCTTACGTGA GGCTTACATT AAATGTGAGA CAGGGAGAGA GGCTGATTT  
3901 CTCTCCCTGT CTTCATTTT GCTCTCTCT GTCTAGCCCT CTACACTCCT  
3951 GCAAGAGCAA TCTCTTACAA TTGCAAAITG AATCAATTTT CATCCTTAGA  
4001 TAAAGCCCTT CTGCACCTCT CCAATAGCCA TAAGAGAAG TAGATTACAC  
4051 ACACGTCTGT GCACGTAAAG TCCCTTTGTG TCTGTCTCTG ACCTGGCCCT  
4101 CCTGTCTCTG TTTTGGCCCT CTCCCTATTT GTTACTTGTG GCTTCCTCTC  
4151 ATTCTGTCTC AACTGCTCTG AATCAGTCAC CTGCTCCCTT TTTCTCCGTG  
4201 TTGACACCTC TCATCCTTCA AGAATCAGCT CAACATCAGG TCTCCTATGC  
4251 AGCCTTTTCC AAATTACTCT ACTCCCCCAT GTAGAAGTGA CTGCCCTCTC  
4301 TTCATGTACC CTCTCCCTGT GCAGATGTGA ATTACGCCAC TACTACAGGT  
4351 TAATGGCCTC TGTGGTCCCA CCACCTGCCA CATTGTCTGG TGCATAGTGA  
4401 GTGCACAATA GTTATTTGAT AAGTCAATTG ATTTCCCA CAATGTATTA  
4451 TCAAAITGTA CATGATTTAA GATGCTCAGA AGGAATTTT TGACCAAAATC  
4501 TAGGGGTGAA ATAGAGAATA TTGTGCTCAA ACAAGACTT CTCAATTTAT  
4551 TTACAACACC CAGGAAAATC CATCAGGAGA AACTACCGTT CTCTCTCAA  
4601 GTAGCTCAGT GCAATGAAT TTAGGGATGT CGGACTAGAG AGGCCACTGA  
4651 GATGTAAATT ATAGCATTTT CTAATTTAGG TGACCTTGA AGAAACACTA  
4701 GGGTCTCTGA AGACAGGGCT TTGGAGTCTG CAGAGTAGIT GCTGACTTT  
4751 AGAGAAGCTG TTGTCTCTCT TTGAGCTTCA ATGGAAAATG TAAATGGCA  
4801 AACCAACAGC TGCTTTTCAA GGATGAGATG GGTGACCAGA ATATAGATGA  
4851 CATTCAATAC TTTTATTTA CTCTCTCTC ACTGCATTAC CCTCAGTAAA  
4901 TTGATTCAAA CCTGAGGATG TTTCTGAAAG GCATGCACAC AAATATGAGC  
4951 TCTGCGGAGG TTGACAGAT TAAAGGGGAC ACCCTCTTAA GAACGTTCAT  
5001 AGTGTCAATC CACTTGATCC TCAAAAGCCA GAGTAGAAAG AGCATGAATG  
5051 CTTTCTTTAA GCTTCATGCA ATGTGTTCCG AACCCTCAC AGTGACTTAC  
5101 CTTTATCTTC CTGGCTTAAA CATAGGACAT CATTTTGCG TTTTAAAAAT  
5151 CAGTTTAAAG AGATGGGTTT TATCTATGTG TGGTTTGGAT TGAACCTTAA  
5201 AATGTAAATT TTGAGAAAT TCAACATAAT GTATTTATTT GTGATCATTA  
5251 TACTTGTGTT TTCAATACAT GCTGGGTTTG GTATCAAAAC ATTTAACAATA  
5301 CTGGGGACAT TTCTCATCTA TTTTATACAA TCTTGGCATG TTAATGACT  
5351 ACAACTCATC TCATGCCAAA ATAAGAACAT GCAAATGCC CAAAGAAAGA  
5401 AAATCTGTTT ACTTTCAAAT TCTCAATTTT AAAAATCTAT ATGGAATACA  
5451 GATTTTAGIT TATTGATTAA AATAAGATT CCAGAGTTTA AATTCTAGGT  
5501 GGCATTTTIG TTTTATAGT CCTCAGGCC ATTTTAGGCT TCATTTTATC  
5551 CTGTCTCTC AGTCTCCAAC TGTGAACATT ATGTACAGT CTTACATAG  
5601 CAGGTACATT AATTACAGAC CATTAAATGTA AACCAAAA GAGTGGTGGG  
5651 CAGTGGGTGG GGGGTGAATG GAAATGGAAA GAGGCAACAA CTGAGGGCAT  
5701 TGTGCTTTCT GTGAGAAATA TGGGAGAAAG GCTAGGAAAT GTTCTTAACT  
5751 TGTGTACTCA GAGCTATTTA TGCCTTGAGT TCTAGAAAAG CACATACAAC  
5801 TTTGTGGTTT CGTGTCTGT TTCTATCTAC ATCTCAITACT GTTTCTATT  
5851 CTCAAAAAGT AACCTGTCA TCTCTTTTCC TCTCCAGATT ATTTTCAGGA  
5901 TTAGCTTCTG TTATAAAAA TAGCTGTGAC AGATCTCTTA CAATAATTAT  
5951 TTTCTATTTT ATTTCTAAGG TTTATTTATT TATTTATTTA GACAGACAGA  
6001 GTTCACTCT TGTGGCCCAT GCTGGAGTGC AATGGTGCAA TCTCGGCTCA  
6051 CTGCAACCTC TGCCCTCCAG GTTCAAGGCA TTCTCTGCT TCAGCCTCCT  
6101 GAGTAGCTGG GATTACAGGC GCCTGCCACC AACTCGGCT AACTTTTGT  
6151 ATTTCTAGTA GAGACGAAGT TTACCATGT TGGCCAGGCT GGTCTTGAAC  
6201 TCTGACCTC AAGTTATCCA CCACTCAG CCTCCAAAG TGCTGGGATT  
6251 ACAGGGGTGA GCCACTGTGC CTGGCTCTA GGATTAATTT AATAGAACAA

FIGURE 3B





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Serial No.: 09/776,705

Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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6301 TCTTCAATTA TTTTATCTTT CTTTATCTTT CTTTTCATGT AGGAAATGTC  
6351 CTAATAATTTT CAAACCTCA ATTTGAAAGC ACTTTTAAAA TCATACATAG  
6401 TCGAGCATTT TATATAAAAA CAACTAAAAA GTCTGTGACA TTTTGCAGTA  
6451 TAAAAATGCA ATGGCAGCAG CAGGCTTAT TAATTGAGCC TCTTGGAAAT  
6501 GTGGCTGGTC CTAGGTCCGT AGCCTCAAGG GOCCTGGCTT GTAACGCGAG  
6551 GAGCTGACCA GCACAGCTCT ATAACCAAGT TGTACATCTT CTAGCCTGTG  
6601 TCCAAGAAAA CCAGAATCAC AAGCTCTGT GATAGTGAC ATCTTAAAGT  
6651 TTTCTTTCCC TCCCAACTCT TTTGCCAGTT CATTGAATTG CTTTAAATAAT  
6701 TTCTTTAGTT TCATTCATTA TCTGTTAATA ATCCATGTAC ATTTTGAGAG  
6751 TAATTAAAAC ACATACGCAC ACACAGAAAC AACCAACACA ACACACAGCT  
6801 ACCACTGAAT TACTTTCCAG TAAGAGATGT ATGTATAAAT GATTGTACCA  
6851 AAAAAAAAAA AAGAAAGAAA ATACCAGCTA CAGGGCCCTG CCTGGGACTG  
6901 CTGTATGCCA GGGGAGAAAT GGGGTCTCCC CCTGGGTATG GGTGGGTATG  
6951 GGCCTGCTCG TTCACTTTTC TGAGCCACAG TTCCCTATAG GGATATTTTG  
7001 AACATCAGAT GAGATAAGGA TCACAGTGCC TAGGCATTTA ATAAATATTC  
7051 GTTGAATTAA TAAATCATC TGATTATGGT ATGGTAGTAG TTCAGAAAAT  
7101 TCTGTCAATA CCTGTACTC TTTCTTTTGA AGGGCTCTAA ATGGGAACAC  
7151 AATTAGTTGT AGTCTCTTGC ATAGCTAATG TGAGAAAGAG GGAATGTGGT  
7201 ATAAACAATT TTTTAACTAA AAATAATATT TCCTTCTTTT ATAACATCCT  
7251 TCTTCCATCC CAAAGTATAG TTGTAAATGG AACTCAAAAT TGTGTGGTCTG  
7301 GAATGACCGT TAGTGTGAAG GAGGAAAAGA AAATTGGGGT GTCTTATTTTC  
7351 CCTCCTCTG ATTCACTTAC TTAGATCACC TGAAACATAC ATATGATTCA  
7401 GAGCATATAT TTAGATGTTT TCACTTTCTT ATTTGTGTGT GTGTGTGTGT  
7451 AGTCAATTTG CTAATGAAGA CACTGAAAGT CAGAAATTC TGACAAATGG  
7501 ATTTTGTGGG AAAAAAGAGC TGGCAGATTA TGCTGATGAA CACGTAAGTG  
7551 AATCTATGCT TTCAAGCAAT AAACGGGACT GAGGGTGTCT GATCTACCTA  
7601 GGTCTCTGTG GGAACAACAT GTGACTGAAA TTTTCCAAGC CTTGATCAGC  
7651 ACATTCCTGT TTTTATTCAG CTCTTACTGG AATAAGGGCT TGTTTTTTCC  
7701 TGTGTGCCAT ATGGCTGCAT GAATCATTTA TGAAACTTAT GTGTTTTGGG  
7751 GGGAAATCAT TCTAACCCAA AGGTAATCTA CAATCATACA TGTTTTTCCCT  
7801 TCTTTATGTG ACTCCCCCTG TAATTGTGAT TTTTACTGAG GCCTCTGCTG  
7851 AAACCAAGCA CTGCATTCG TTGAAAAATTA CATGCTTTTA TTGATGTGTA  
7901 GTAATGGCTT TACTCCTGTA ATGTATCTTT AGTCTTCAAT TTTGGACGT  
7951 AATCTGCAGA TAATGTGAGA ATAAGGATAA CCCCATAAGG TATGCCCTTT  
8001 GGCAAAATGT TGCTTATAT ACATCCCTTC TTTTCAAGC ATCCCGGAAC  
8051 CACTTCTTTT GGAATGTCTT CATTTAACCT GAGTAATGCC ATCATGGGCA  
8101 GTGGGATCCT GGGCTGTGCC TATGCCATGG CCAACACAGG GATCATACTT  
8151 TTTATGTAAG TGAATGATA TGTCTACATT TGGTGATGAA GTCCATGCAT  
8201 ACGTGGTGGC TTTTCAATT AACAACTCA AGTTTGATCT TTGTGAAGGT  
8251 GAAGACTCAG AGGAGGCTAA TCATGGCACT TGGTCAACCA ACCATCCCTA  
8301 ACCCAACGCG AGAAAGTGTA TGTGCTCAAT CAACCAAGT GCTGGAGCAG  
8351 CCTGCCAGA AGAATTTTGT TATTCACTAA ATACTTGAAA TAATTGTGGT  
8401 TTTAGCAACC AAAAAGATCT TTCCAGAAAG CAAATCTGAT TTTATCTCAT  
8451 TCTTAGGAAA GAAGCAACCA AGCCTAAGAG CCTGCATGC CCTTGCCTAC  
8501 CTATGTGCC ATTCCTGTGA CCCCCTGTGG ACAGATACAC TGGGCACAAT  
8551 AGCCTTCTCT CCATCCTATG AAGATGCCAC ATTCCCTCTC ACCATTGGAC  
8601 CTTTGACAT GGTCTTGGAA CCCCCTCTCT TTCCCTCTCT ATCTAGTTAA  
8651 CTCTCATAT GTCACTTCTG TCTCACCTGA ATACTGCGCG CCTGATCTC  
8701 CATGACTGGG GCAAAATCAC TTATCATAAC ACTCACCACA ATTTTAAATG  
8751 TTTAGTGCCA TTGTCTGAT TCATTGTGTT AATATCTGTC CCTCTGTCTG  
8801 GACTATAAGC TCTAGAAAGT TGAGCCCATG TCTGTTTTTA CTCACCAATG  
8851 TCTTACCTC CAAACCTAGA GCAGTGCCTG GTACAGGCAA TATTTGTGTA  
8901 GTGACCAAC CTATATCTTA AACCTACGTA CTTTCAACAA ACTTGTTCAA  
8951 ATGCTGCCA AGGCTAGCAG CATCTGGTAG TTGACCTGTA GGTGGATAC  
9001 TGCCTGTCT ATGACAGACA ACAACAGAG TTTATGTGCA TCATGTACAG  
9051 CCTGGCAATT TCCAGATAT AGTGGCAGC AGTGGAAATC TTCACAAGAA  
9101 TAAAGTCTGA TGTTAGGCAC CACTGTGGAC ACAGATCCTA ATCCCAAATG  
9151 CAACGCTAGA GAGTTAAATA ACTGTCTAAG AATGCAACAT TTATATCACA  
9201 AATATGTGCT GTTTATGTTC TGAATATCAC ATATGATTAG TAATCACACA  
9251 GCTATTTGAG GCCTAAGCAT CAGGACTATA AATATTTGTA TTGTGTAGT  
9301 GCTTTGATG AACCTTTTGA TGTATAATAT TCTTCAGCTG AATGGGTTTT  
9351 TATATCAACT TTACTTTTAT ATAAGCCATG TTTTGAAATA AACTAGGATT  
9401 TTAATAATCT GAATTTAAT AGCTATGTAT GTAGTCATAT ATTTGTATGC

FIGURE 3C



Docket No.: CL001010

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Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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9451 TTTTGTAAATG TGCTTACCTC TAAGACAAAA AAACCTGCCT TTCTTTAATTA  
9501 ATTATACATA CCATTAAAAAT GAATTAGGAA GTTACAGATC ACTGATGAAT  
9551 AGAAATAGGA AAAACTTCCC CCAATCCCAC AGTCATAGAT CATCTTCATG  
9601 AGAGAAGAAT GTTCCACTTT TTAATATGAG GGCTTCATTT TAGGCTTATA  
9651 AACACTTAGC AGATGAATTT GGTACAGACA ATTAAATCAC TAAACATCAT  
9701 GGGGTGTGTT TTGTGTGTCT AAGTAGCCCA GACTGGATTA AGCTTTCTCT  
9751 CTTAATTTAT AGCAAGTGAC ACAGTATTTT AAAGGTTTAA CTCTTAGTAT  
9801 TTCTGCCCAG AGAAAGTACA TGTTTAGAAT ACAGGGAATG CTCATTATTT  
9851 TTCCAGGGAA CAAAATTATA TAATCTGAAT TACATTATTC CTTAAAAACA  
9901 GTTAAGTTCA TAAGGCATAT GGAATAATAT AGGAATAAGT CATTGGTTAG  
9951 ACAGTTCTGG CAAACATACT CTATGGAAAA TAAGAGTGCA ACATAGCTAC  
10001 AGGGGTATATA AAATTATATA TTCTATGGTC AAATGTACAT TTGTAGTATT  
10051 GATTTCATTTG GAAATTACCA AGGGATTAGA TCAATTGTGG GGAAGTGTGA  
10101 TTTTATTAAAA ATAAACAAAG ATAAAGATTT TTTTCTGAA TTCCAGGTAA  
10151 AAGGCAGCAT TGCTCTCCCA TTATTTACGT AGATGCTTCT ATCAACATTC  
10201 TTATTTTGTG GCTCCAAATC TTGGATTTTG AAAAATACCA ATCCGTATAA  
10251 ACATAAAGAA ACCATACATG CATGTGGGGA TCTAACACC AGAAATGACT  
10301 CTGAATGCAA AAAAAAAAAA AAAAAAAAAA GGGAATTTTC GTGCCCATC  
10351 CTTAGCTTTC TCTGCTTTCT CTATTATATA TGCAACTGCC TGCCCTCTTA  
10401 TCTTACAAAG TACTTGTGTA TCTAATGCAC AGGATCAGCA GTAATGCAGC  
10451 TCAGACTGCA TGCTTTGGCC TTGGATTTC TAGATTTCAG ATTAAAGTTT  
10501 AGTCAGGCTA TTGAATAGCC CTTCATTTCT AAGTGTGAT GTGAATATCA  
10551 TGCAATATG ATGTACATAT TCCCATGTGC TGAGTAAGTA GATGTAGCAT  
10601 TTGCTAATGT TGCTATACAT TTAGCATCTA AGTTATGAAC CAGATCTAC  
10651 CACTGGGTAA CATTAAAAA AAGTTAGGGA CTTCAGGTAT GTAAAAATATA  
10701 GCAAATCTTA TTTCTACGAC TTAAAGGGT ATGTGTAGAG TTTGAAAAG  
10751 AATTTCTCAG CCTCCCCAA ATCCACATAC TTTTGGAAAG CTGATGATTG  
10801 AAAAGATTAA TGTGATCCTT TATTGTAACTA TCTAACATAA TTACATTTTA  
10851 TTTATTGTAG AAACTTTATT ACCTACTCTC TCTTCCCTTT GCAGATCAT  
10901 GCTGTCTGCT GTGGCAATAT TATCAGTGA TTGAGTTCAC CTTTTATTAA  
10951 AAACAGCCAA GGAAGGAGGT ATGCTACCAC TTGAGTCCAA CACATTTCTAT  
11001 TTTAATCTCT ATAAAGAGT ATTTGAGTCT GTTGTCTCAT AACCTTAGGA  
11051 TGATTATAGT CAGTTTACA TTTCATTTTC TTCTGAGCC AGTGACACGA  
11101 TCTCTCAGTG TTATAGTTG TTGGGCAAG TGAGAGGCAG GAGTGAAAGT  
11151 CAACTGGCTC AGGTTCAAGA CAAATAGAAA AAAGAAATTT CTGATATATG  
11201 ATAGAAATAA CTGTTTGTAC TTGCTACATG CAGCTAAAT AAATAAAACC  
11251 ATTGATTTCT GTTTGGAGAA CATTTTGATA TATTGCTTAT TGGTTTGTGA  
11301 GGTTCATCT TTTGGGCTTA TAATTTCTAT ATGATGTTA TTACATGTT  
11351 TGAGACTCCA GCATGGAATT ATATGACAAA AATATTTTAG TCAITAAAC  
11401 AATCTCTTTA ACAAGGCTAT TTATCTTTG ATTTAGGGT CTTTGATTTA  
11451 TGAAAAATTA GGAGAAAAG CATTGTGATG GCGGGGAAA ATTGAGCTT  
11501 TTGTTTCCAT TACAATGCAG AACATTTGAG GTAAGGGGAT ATACTTTCCA  
11551 ATGGATCCCA TAACTTTCT ATAGCGTGT CAATAAATAA GAAACTTTAT  
11601 GCAATATAAC AGGCACTTTA GATACAGAAA AATTGCTACT TATAGTTCTT  
11651 AAATTTTAAA ATGATAGTTT CTAAATAGG TTGTGTCTCT GCTTTAATTA  
11701 AAAACAGCAA TATCTAAGAA TGAAATAACA TATAAAACC TGCCAATTGA  
11751 ATTCTAGAAT TAAAAATATA AATAAAGCT TTCTTGATTT TTAATGTTAT  
11801 TATAGCATGA ATTATTACTC TTAATAATG AAGAATTTGT GCTTATATCT  
11851 GTCAATGACA AAACAGTTGA CGTTTCTAT GTGTGACTGA GTTCGATTTA  
11901 CTAAACTGAA AAGTGGGTGT CTGGGGGAAC ATAGCCAAAT GCTGTGGTCC  
11951 TTGAAACGCA GCTGCACATG AGCCAGCCCA CTAGACAGTG TCTCTGGAAG  
12001 TTTACTAAGG CAAAAGTCTG GCTAGGCATC AAATGCCTTA TAAACCCCGG  
12051 TTGTGTGATT CTATGGATTC TTATAATTCC CACTGAATTA TCATTCCAG  
12101 TGTAGGACCT AGAAATATAT ATATATATTT TTAACAATGT TCTCTGTTG  
12151 GTGTGTGTTG CCACAGCTT CATACGTCTT CTGTGTGTCT TTTGGCCCTC  
12201 AGAAGGCATC CAAACCCATA TTTGAGATGT CCTGCCGCT GCTTCTGTGC  
12251 ACATGGCCCC AGCCATCTCC CCACATAATG ACATTTACTC CCTCACCTCC  
12301 TACCCAGTCC CTAAACCTGC TATTCTATTT CTCTGATCTT TCTTTTCTCA  
12351 GTGAATACCA CCAGCAGTCA TCCAGTTTCT GAGGGCAGAA ATCTGGATGT  
12401 CAGCGTAAAT GTTCTCTTTT CCCCACCTCT GCATGTCCAA TCAATGGCA  
12451 AAGTCTGTTC ATTTGATCTC TTACTTATCT CTGAACCTC TCTCTCTGT  
12501 CCGTCTCAT GACCACAGAT GATCACCATT TATAGCTCAG ACTATTGAG  
12551 TAGTCTCTTA ACTGGTCTC CTGGCTGAG TTTCCCTGCT TCTCAGATAA

FIGURE 3D



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Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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12601 ACTCTAATTT GTTCTCCAGA TAAACTTTCT CAAATTGAG TCIGTTTCTA  
12651 CTTTTGTGCT GCATAAAATT CTTGAGCATG CCTTTATTAT TTTCAAGGAA  
12701 AAACITAAAC TCATTGGACT GACACAAGAT CTTGGTCTAG TTTCTCTGCT  
12751 CAATCTTTCT AAACITTTCT AGCAATGCC ATATCTATCT ATCTTTATCT  
12801 ATCTATCTAT CTATCTATCT ATCTATCTAT CTATCTATCT ATCATCTATC  
12851 AATTTATCCA TCATCTATAC CCTACATGTC CTGTGTCAAA CCATAACAAA  
12901 TTATATTTAT TCCCTAACA GFACTATTTT AATATTTTTA AAAATCATCC  
12951 ATGCCTTCTT TTCACAGGCT ACTTTCTCCC CTGTACTGTC TCTCAAAGTC  
13001 CTCCAACCCT AACACACACG CACACACACA CACACACACA CACACACACA  
13051 CACACACAIT TTCTCTCTCA CTCTGCTCAC CTGGTCTATT GCTCCTCTAG  
13101 ACTGGTAAAT ACTAGTTCTT CTGGGCTCTC ATGGTCTCTG TTGTATCTAG  
13151 TATGTTACTG TTTTCTAAAG GATATTTTAA AACACTTGAG TAGAGAATAA  
13201 GCTTTTGGAG TCTGATGGAC CTGAATTTGA GTCTGTTTCT GTCACTATCT  
13251 GTGAACCTTG GAAGATCACT GTACTCTCTT GTCTGATTTT TTCAATGTATA  
13301 AAAATTACCT TACAAAGGCT ATTGTGAGGA TGAAATAAGG TAACATATGG  
13351 CACATAATAA GTGTTCTGTA TATGCTTCTC TCTTCCCTGG TTCTCTGCTT  
13401 CCATATCCAT GTCTCTGGAG TTGCCCTGAAT TATTTTAA ATAGGCATTT  
13451 AAAAAATTAT AAAACAAATA TATGATGATT GTGAAAACT AAAACACTGC  
13501 ATAAATATAT AAATTACCAA GAAAAGTTTA TGTCACTCAT CCTCAGAAAT  
13551 AACCTACTAT AGGTTTCTCC CTATGCTTAA TTCAACAAAT ACATTTGAATA  
13601 TTGTTAGTAT TGGATCATCT TATGATACCG ATTTTCAGCT TTTCTTTTAA  
13651 ATTTAACAAT ATGCCCTGAA TATATTTGCA TGTATTTCTT TTTAATGATT  
13701 TTTGAGGTTT CCATTACACA AATGTGCCAT AATTTGTTTA CAGTATCTCT  
13751 ATTGATGAAC AGTTGGATTG TTTCTAATTT TTCACGTGTA TAAAAATGCT  
13801 ACAGTAAATA CACTTGACCA GAGATCTTGC AAACAGGCAA CCCATTTTAA  
13851 TAAATAAAAT CACTGGAGTT ATCAAGGATT TCTGGAATGC AGAAATTTCT  
13901 TTAGTAAATCT ATCTAATCT ATCTACCTTG ATAATGGATA GTTGGTAAGC  
13951 AGATAAGTAA AATTCAGCCA TATCTTATGA TTTGTGTTAA AAAAAATTTT  
14001 ATATGTTAAG ACTACAATCT TGGGTAGAAT TTGACAGTAA TATCAAAAT  
14051 GTCTCAATTA TTTTACTGGT TTGGAGCCAT ATGCAATTA GCCCCCAAA  
14101 TCCCAACAAA TAGACCCTT TACATTTGTT TCAAACTCTC AGCCCTATCA  
14151 AGGTTTAAAG TATCGAGCAT TTCAATAGGAT TGCCCTATAG TTGGTCTAAT  
14201 TTAACAACCTG AAATAACCG GCATAGCAT AATTAAACCT GGACTCAAGA  
14251 AGTTGAGTGG CAGCACCTCA GCTGTGGTTC AAAGCATAGC CACTACTAGC  
14301 CTTCTAAACA ATGGAATAAA GTATAAGCG GTCTCTCAGT CAAGCCTCAC  
14351 ACAGTAAAGA GCGTGACTT TAAGGAGTA AGATGAAATA TCGTAACATC  
14401 ACCCCAGAAA TAATGCTCTC ACTTTGGTTA CTTTATTTGA TTAGTTGATA  
14451 TTTGGCATAA GAGAAATCAC TTGTATTTCT CTATTTAACA ACTCTACATT  
14501 TAGAACACTT AATTTTCTCA ATCCCTTAAA AAATTAAAT TTAATGACGA  
14551 TGTTTTCAACA TTAACAGATT AATGCTGGA TCATTTCTGA TTTTGAAGA  
14601 CCAACATATG TAACATCACT GACATCACTG AAAACAGCA ATTAATAGCT  
14651 GTAACATTGA ATGGTACCTC ACCAAGCCAG CTAATCAGAA ATATCTCTCTG  
14701 TGTTCACACT CTGTAAAGAT TAGCTTTAGC CAAGGCTTTT GCAAAGATTA  
14751 ACCAAATATG GTGTACAGAA GGTACATCCG CTATTTGTAA AATCATTTCA  
14801 CTTTGACAGT ACAGAGAAG CACCAGCCCT TCTGTTTATG ATGTAGTCCG  
14851 TCCTTTTCAA GCTGTATGAT TGTGGACATG TCAACTTAAC ATCTGGAGT  
14901 TTTTATATCT TCATCAGTGG AATGAGAATA ACAACATATA TCTGTCTATC  
14951 TCACAGGTTT TTTGAGATGA TCAATGAAG TAATGTGCG AACTAACCAA  
15001 TGTGGGGAAT TATTATCATC ACTGTACTT TCAATGAAG TGAAGAAAAT  
15051 ATTTTAAAC TCAGTAGTTT AATTTACAAT TTAAGTATGT GTTTTAAAGT  
15101 GCGTGTAGC AAAAAATCAC TAGAAGGATG TAGGACACAC TTAAAGTTT  
15151 CATGTAAAT TTTGTAGTTC TATTTTAAAC TGAATCTTTT GCGCATGTGT  
15201 CAACAAATTA AGTTATCTCT TCACCAAAATG GGTTGGCTTG AAAAAAGCGT  
15251 GATGCATAAA TATTTACAGT TGTAGGCAAA ATTGTAAATG TATGTATATG  
15301 AATACATATT CATTTTTCAC GGGAGAAGGC TTGTAGATTT CATCAAGAAA  
15351 TCTTTTCAACA GAGTAGATAA TCATTCATGT ATCACTTACC TAGATGCTCA  
15401 TGAAATTTTG CCACTTTATA TAATCTCTTA GTTAGCCAAA AGGAGAGTAA  
15451 GATGAAGAGG GGGAAAAAA AAAACTTCTT TGACAAAGAT GGAGAGAAGC  
15501 TGTATCTCTT GTATTTCTTT TATCAATCCA GGAAGCTTTT GGTTTTGACA  
15551 ATAAGTGGTC TGAGACTTTG TGTACTCTCT AGATAGGTCC CGGAGGACTA  
15601 GATTTGGTGC CATCTGCAGA AAACCAGAGG GGATATATTG ACTCTGCAGA  
15651 CTGGCCCTTT GATTCGCA TCTCTCAGCT GGCCCATGCC TTTTGTGGC  
15701 AGACTACTGC CCAAGTTATA GACACTAACA CAGGCACACT GAGTATGGGC

FIGURE 3E

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TECH CENTER 1600/2900

15751 TATGTTGATT TATAACTAAT GAGGGCAGAA CCTTAGAAGT GCAGCTTCAC  
15801 TGTAAACTTT GGAGCAGGAT TTAACACAGA ATCAGCCCTG ATACTGTATA  
15851 CAAAGGTCCA CCTGAAAGAG CTGGAAGGTC AAATGTCTAT CTGGAAGAG  
15901 AACCTGGGAG CAGTCCCAA TACACAATGA CTTTCTTTTC CATTTGGGGG  
15951 ATTAGATGTT CATCTTACAT ATCCCAAATG TCATAACTTG CTTCATGTG  
16001 ACTTCAGTAC TGTCCACACC ATTAAGCTGT CACATTTTCC ATTTTAGCAA  
16051 TGTCAAGCTA CCTCTTTATC ATTAATATG AACTACCTGA AGTAATCAGA  
16101 GCATTCATGG GACTTGAAGA AAATACTGGG TATGTCTTAT GCTCCCTCTG  
16151 TGACATCAAG TGACTCATTC TACTTGGTCT TTTCTGATTC TAATATCCCT  
16201 GTCTCTCACT TCTAGAGAAT GGTACCTCAA TGGCAACTAC CTCATCATAT  
16251 TTGTGTCTGT TGGAAATTAT CTTCACATTT CGTCTCTTAA AAATTTAGGT  
16301 AAAGATAITTT TCTAAGTGA AATATTTTAA TTTTATTTTC ACATTTAAAT  
16351 AGGTAGCTA ATTGTAGATG CCATATTCAC CTTCCAAAT GCTTCTCTTA  
16401 ACTTCTAGGT TATCTTGGCT ATACCAGTGG ATTTTCTCTT ACCTCATGG  
16451 TGTTTTTTGT TAGTGTGGTA AGTGATGTGA TGACATGATC CTTCAGGTT  
16501 GGTAGCATG AGTTTTTTTG TGCCTAATTT AGTGTCTCA TTTTGTCAA  
16551 GCACTTCACT AATATGAAAT AGTCTTGTGA TCACAAGTGA TTTTCTGTGA  
16601 GACTAATTTA GAGCAAAAA AGAGCAGCTA CGATTTAAAG ATAGTTGAGG  
16651 TAGAATATCA AAGCTACTAC TAATGGTTTG GTCTAGGCAC ACTGGTTATA  
16701 TATGGGGAAA AAAGGAAAAC TTCAAGCAGG AACATGACAA TAATCTGGCA  
16751 TTTAGAACAG CAGAGGAGAG TCCAGATGA GAAACAAGAA GGCTATATCC  
16801 ATATTCACAT GAATCAGCCA TTCTCTCTTA CACATTCAC CCATTAAGAG  
16851 AGGACAAGAA CAGTGGGATT AAAGAAGAAA TCTCTCTCTC TAGGCCCCCTG  
16901 ACAAAGAGG GAATTTCTTG CACTATCATG AATGCCAAAA TTTATAAAGC  
16951 ATTTCCCCAA AGAGGTAAAG GAGAAGGAAA AAAAGTTTGT AAGACCATG  
17001 TCACCTTAGT TTGAAGAAAT AAGGAAATGA TCATCTTTCT CATGGAAGGG  
17051 CATGAAGAG GGTGGGAAGG ATTCTTGCAA AATATTGTCC TGTAACTCT  
17101 AAGAGGCAGG GCTGCCAATC ACAGCTCCAA CTCTTCCCTT AGAACAGAGG  
17151 CTAGAGGAG TTTACTTTGT CCATTAGTCT AAAAGGAATC CTAAGTCTG  
17201 TTCCCTCACC CCCCACCTTA TAAGCCACAC ATATGGATTC TTATTTCAIT  
17251 GTTTTTTCTC AAAAAAGCTGA TTTTTTTTTC TTTTAAATG ACTGAGTCTA  
17301 GGIGATTTAC AAGAAATTC AAATACCTG CCTCTACCT GTTTGGATC  
17351 ACAGTGTGG AAATCTGTCA TTCAACAACA CGCTTCCAAT GCATGTGGTA  
17401 ATGTTACCA ACAACTCTGA GAGTCTGAT GTGAACCTCA TGATGGATTA  
17451 CACCCACCC AATCCCTGAG GGCTGGATGA GAACAGGCC AAGGGCTCTC  
17501 TTCATGACAG TGGAGTAGAA TATGAAGCTC ATAGTGATGA CAAGTGTGAA  
17551 CCAAAIAC TTTGATTTCAA CTCCGGGTA AGTGAGCGGT CCGGCTTCT  
17601 AATGAGTACA GTTATGTGTT TTCTAAGTTT TTATTCATA AACIGAGATG  
17651 GCTGAGATC ACCATCTATG TTGGAATGCT AAACAAGTGG TGTGTCTTT  
17701 GTTTTTCAGA CGGCTATGC AATTCCTATC CTAGTATTTG CTTTGTATG  
17751 CCACCTGAG GTCTTCCCA TCTACAGTGA ACTTAAAGAG TAAGGCAGCC  
17801 ATCATTTTAC CATTTCAATT TGCTTTGAAA TTCTGCTCAT ATGTTCAAAG  
17851 ATCTTTTAC AGGAAACACA GTTTATAGCT TCTCTCTCAG AGAAATATG  
17901 TACTCCATCC ACTCCTCAGT AACATGCTTT AATCAGAAAG GTGGGAATCA  
17951 GCOCCACCA GCACTACCTT ATCTTCTTTT TCTCTTTCT CTCCACATA  
18001 ATGGTTCAGG GGAGGGGTT ATGGCAGGTG GACAAGGAGT CGATGGTTGT  
18051 AATAATTTTG GCAGGTTTG GGAATTTAAA TTTGAATTTT GTTCGGAAGA  
18101 AATGATGTCA GCTGGACTAG AAATGAAAC ACCCATGAGC ACCAAAACIT  
18151 ATGGTTAGG GCAGCCTCGA TAAGCCAGTG ATGTCAATTA TAGTCAGCAC  
18201 CTAACCTTTC TCTAGAACAC ATTCAATTACA AGAGATGTGT CAATATCTGT  
18251 CCTTTGTTGT CTTATTTGTA CAATAGATC ACTGGCTAGA AAATCTTGT  
18301 TCTTCCAGCT GATGTTCTAT GGTTCAATTT TATTTCTTTT CCTTTGAGT  
18351 TGTGATATTT TGCTTGGGAA CAAAGGATAT GAACATTTA TAGCTGTTTT  
18401 CCTCTTCTCT TTAAGGGAGG ATATTATATA ATAATTTCTA ACTTCTTTAA  
18451 TCTAGACATC AGTAACCTCA GTCTTCATTC TCACATAATA GCAAAACIT  
18501 CCCCATAAAT TCTGATTTAC CTCATAAAAA ATTTCAGAAC ACTTTCAAGT  
18551 ATTTTGATGT CTTTGATTTA CTTTGAAAT TACATGTAGC AGTTACTCCA  
18601 GAAGCCGAC AATTGATCTT TGGCAGCCAG GTTCTTCTA GAATGGTTTT  
18651 CAGAAGCTTT TCAGGTAGTC TGGACTCCTG GCAGTAGTAC TTTGCTGACT  
18701 CTAAGTGGT CTTTCTCTCA TTTAAAGTCA TCTCAATTAT AAATGCAAAA  
18751 GCTTCTCTG TTAGAGCCT GTTTCATCTT TATGTTAAIT ATATCTTAT  
18801 TCAGTGGGA AGCTTACTGA CCTACGTGAA ATAGACTGTT CCTCTCTAG  
18851 GGAAATGATT GTTTTAAAGA CTGAAGGACT AGTGTTTAAG AAAAATGGAA

FIGURE 3F



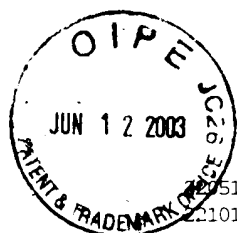
Docket No.: CL001010  
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Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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18901 ATGAATCCCTC ATTAGCTCTC TAAGACAAAT TTAAATCAGC TATAAGTTTA  
18951 TGIACATAAT ATGCTCTCAT GATTAGCAAT ATAGATATAC TTTTITATTA  
19001 TTATTTTCAT TTTGAAAAGT GATTTTTTTT TGTAAAGTTA AAAAACAAAG  
19051 CTGTGTGTTC TTTCTTTTTT CAGTCGGTCC CGGAGAAAAA TGCAAAACGGT  
19101 GTCAAAATATT TCCATCACGG GGATGCTTGT CATGTACCTG CTTCGCGCCC  
19151 TCTTTGGTTA CCTAACCTTC TATGGTAGGT CACTCTGAAA GTCAITCTCT  
19201 ATATGCAAAAT CCTTGTTAGG CTGGTCTTGG ACCTGGGTAG GTATGATTTT  
19251 TAAAAAATGC CTTCTATAAG CATGCTCTAT AGATGACACA TATTCAATTA  
19301 ATATACTATT TTAGTTTTGT CACTTGACCT GAGGAAATGG GGCTGATTTC  
19351 AGOCTGGCTA ACAAGTTACA AGAATTTGTG AATTAAACACC TATTTTATAA  
19401 AAAATATCCC TCAACAAAAA TTATTTTCTT CTAGGGATAG ATGATATTTT  
19451 TCTGGCTAGA CTCCATAGTC CAACTCAGGC TACAAGTGAT GAGAATGAAT  
19501 CCACCTGCAT GTGATAAAGC TCCCTTGATG GAATTAATTA CTGCCACACA  
19551 AATAGCAGGG AAACCTGCCAG GTCCCTCAAGT TTGAATTTGC CTCTCTTTA  
19601 CCAGTCAAGT CAAATCTGGG AGCTTGGGAC TTTAGGTAAA ATTTCTGACA  
19651 TATCCCATTC TATTTTGTTA TACTAAATGA TTTCCTAAGA AAGAGGACAT  
19701 GACAGAAATT CCTTCAATCT AAGAATGCAC CACCAAAAAA AAGTGACTAT  
19751 GGCCACATTA GATTATGCCT GCAACATTTT CTCTCTGGCA TCTTAACAGT  
19801 TCACAAAGGG AGTAGGATGG TACTCCTTCC ATGAAGTGTG GCCACATAAA  
19851 CAGATTTTAT GGAATCACAT ATTGACCTGG TAGCATATGT TTACATGAAT  
19901 CAGTGTATCA ATATAAATAT ATTTTGTAT AAACCTCCTT TTAAGTTTTT  
19951 TAACTTAATT TTTTCTTAC TGACTTGGTA AATTGAATGG CATGTATGAC  
20001 AAATTTGTGA GGAAAAGATT CAGGAGTAGG CCACCATTTG CTTAGTTTTT  
20051 TTTTCTAATT GACTAATATT TGAATATTAA CCAAACATGT GCTTTAGATT  
20101 GGGCATTAAC TTTTGGCCGG TTGTGAAATA ATGAATGACG AGGTCAAATC  
20151 TACTGAAGGT ATTTTCACTA CTTTGTGTCT GATCTTGAGG TGAAAATCCA  
20201 ACTACGCTTG ATTCATAGA TATTTCTTGT TTATTTGTGC TTGGAGTCTT  
20251 GAATGAAGGT GTTTTCAAGT AGGGCTGCAT CTTCGTCTTA GAGTAGTACC  
20301 CACTGGGAGA CCATCTAAAA ATTATACTAA TTATCCCTG CACGTATCIT  
20351 ATACTTAATT TAATGAGTTT CATAAGACAA GCAAAAACIT GAAAGAGCCC  
20401 AAAAAATATCT GTTTTAGTGT GGTGATGGAG TCATAGTTGT TGAGCTTGAA  
20451 AAAATGGTAG CAATCATTC A TCTAGAGT TACACACTGG GTTTGTAAAC  
20501 TGCAATCAGG GTGGCTGCAC AGGTAGGGAC AGGGGAGGTG GTAGGCTGGG  
20551 AGAGACAATA TGTGGGGCTT GGGTCTCTCA TCCCTCTCAA CAAGAGCAC  
20601 TTGGTCTCTG TCTGATTTGT AATTGCTTCT GTACAGCGGA GATAGATTTA  
20651 TCACAATGTA AATGAGCTTG AGAGGCTCTT TATTTTGTAT TATACCTTCT  
20701 GCAAGTTTAT CAGCTTCAGG ACCTCTTGT TCATTTGAAT GAAGGTGGA  
20751 TAGCTAATGA GCTCAGAGG AAGACCAGAG GTGCCCTGGT TCCAGGCTT  
20801 AGGCTTTTTC CTCTGTCTG TGTCTCTCT ATAAAATGTT GCCATAAGTG  
20851 ACCGTGTCTG ATTTGACAAC ACCAAGCGGT TTCATCTCTT TTTTCTGT  
20901 GTAGGAGAAG TTGAAGATGA ATTACTTCAT GCTACAGCA AAGTGTATAC  
20951 ATTAGACATC CCTCTCTCA TGGTTGGCCT GGCAGTCTT GTGGCAGTAA  
21001 CACTAAGTGT GCCCATTTG CTCTTCCAG TAAGTACATA AGACITTTGAT  
21051 GAAAGAAACC TACTTGACC CATAAATTAG TACATGTGTT CTACCTTCAT  
21101 TTTGATTTAA TTATAGGGTG AGTTTGCAAT TGCAATGCC T GAGGATATTA  
21151 TTTTCTTATA GCATTTTGAG TCACTTAAAA TTGGCCATTT AATGTGTAGA  
21201 TAGAGCAAGT AGTTTCAGGT GGIATTTTTA TAGTGTAGGA AAAAAATCAT  
21251 AAAACTTAAT TTAAACTCA AAGTTGAAAA GTGGAGCTGG AGCTTCTGT  
21301 TTGTGGATTA GTAAACTGA GTAGGAGTTC ATATAACTTT GGAACCTTGA  
21351 AAGCCAAAAC CATATTAAC TTCAAATCTT ATTAATTTT ATCAGAGTTT  
21401 TGAAGCAATT TCATTTTTTT TCCAGTTTGT TGTGCTGCAA TAATATACAA  
21451 AAGTTGCCCT TTTTAACTG ATGCCITGAA GGCTAATGAA AAGGGGATTC  
21501 ATGTTAAGTA AATTATATAC CAGAAAAAAA TTTTCAAAA AACAGTTATG  
21551 CTATCTATCA CATATCTCTC TCACACATGG CCTCTGCCAG ACTCACACCA  
21601 GGTCAACCCCT CCTGGCAT TGTATTTGGT GTCAGTTTGT TCTGAGATCC  
21651 CAGAGCAGAG CTGGTAGTGA AGATTTGGGC TGTGTGAGTT AAAACCACCA  
21701 CCTAAGGATA AACACAGGTC TTCACCTTCC TGCCAGCTCC TGTTCATAA  
21751 ACACGTGAAT TACTCATTC TTTGAGGGG AAAAAAATAA GTGACACAGT  
21801 AACGAGCACT GTCTGGACA TAATGTTCCA TACAGGGCTG GCATATGAAG  
21851 ACTATTTCTA TAATGACACT GTGGTCACTT TAAATGCAGC TTGTGTGCTG  
21901 AAATATATT TGGCACATC CTTTTTCATG AGTGCAATGA ATCAGATCCG  
21951 TACTACTATG GTGGCTAATA TTTTACTCTT AAATCATGTC TTGCCCTTAA  
22001 TATATCTGAA AGTATTTTCA ATGACATACA CATAGCTTTA GCTTAAATC

FIGURE 3G



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Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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22051 AGCTCGTCT TGGGTACAAG ACAGAAGACA ACTATAAACA GAAGGTATAC  
22101 GATAGGGTAA AATTGCCAGG CAAACAACCT CACTGAGAAA AGGATATCTG  
22151 GAGCCCTTCT TTTTATGTGT AAAAAATCA CTCCTAAAT TTTGGCACAG  
22201 TGTAAGCATT CACATCATTG TAGAATCAAA GCATAAGAAA TCTGTGATGT  
22251 GCTTCGTGAT TGCCTTATTC ATATTCATAT AGTGTTTTCA AGCCATGGTT  
22301 TTAAGGGATT GCCAGAATTG GCCATCGTCA CACAGACAGC TGGTAACAGT  
22351 TCAACTAGTG CAGCTCATAG CCCAACACTG AGGGCTGCAA TTATTTGTCT  
22401 GGGAAGTAAA AGTCATTTAC TGATGAACAT TTCACCTCAG CATGGAAAAT  
22451 CCAATCTCC CCTTAGAAAT TCTTACCTTA TGTGAGAAAT AAAGCACTGA  
22501 TATAAATCTG ACCATCAGGA ACAGCAATAG TGTGTAAACA TTAGATGCCA  
22551 TTAGAACCAG AATTGACCAT AAGAACCAGA GTTCAGAAAA ATGACTAACT  
22601 GCTGTCTTTC ATTATGTATT TCCACTCAAC ATTAGCATTT ATGAAACATT  
22651 TTGCACATTA TCCGTCTCTC ACCCTTGCAA TGTTACATTT ATATAATCTG  
22701 TGTAAGTGTCT CCCTGCCCC ACAGAGTCTAT AAGTCCCTGG GACTTTGGTGA  
22751 TGTGCACAGT GACTGGCACA GAGGGTGAGC TCTGTCTGTC TTGGGAAGAA  
22801 AAATGGTCTT CAAATGAATC TTGCCCTTGT TTGAAATGTA TAAACTGCTT  
22851 TTTCTAGCAA AAGCATAGAC ACTCTTTTCC TTGGTGACAT GTGCTACGAA  
22901 TTCAGCTGGG TTGAGGATCT GGGCTAAATG AACCAAACTT CCTATATCAT  
22951 GAAGGATACA CAGAGATGGT GACAGAGAGT GGTCACTTCC GTGAGTGGAT  
23001 CTCATCTAAG TCCCTGAAG CTAAATTCAA TTTTTTTTCT TTAATAAAAT  
23051 GATAAAGTGT GTTATGGGG CTTTGTCTTG TTTATTTTGT ATAACTTAGG  
23101 GCTCAGATTT TCAATGTGTC AAATGCTGAC TCACAGCATG GTTCTCTTGA  
23151 CAGTTTATTT CATTTAAGGA ACTCTTCACC AGTAAGTTTA TTTACTTGCC  
23201 TTGATATCTC CACACATTA TAATAAACT AACCAAACTT AATCTGAATT  
23251 AAAATCTATC AGCTTTAGGC ATTATTTTGT GTTCTCTTTC TTTCAACATG  
23301 GTAACTGGGC TCTCTTCTT AGGAGCTTGA GAAGATATGA CTGGGGTTTG  
23351 TTTTCTCTTA CTTCATTTAT TATCTTCTT TTTTCCAATC AGGTTAGTTT  
23401 TTTCTTTTAT AGTAAAGGT GCATAGTAAC TGCCTGTAGT ATTGTGTGAA  
23451 CAAGTGAATA AATGAAATGA ATTAAAGTAG TGTTTTCTACT AGCAGCCCAA  
23501 CATTTCTTTC TCTCTTAGTA GTGGGTGGGG TATCAGTTAT GGAATGGCAC  
23551 CTCCTTCCAG AGGACTGATC ATGTCTATTT CAGCTTATGC TTCCCTTTAT  
23601 GCAGTAAAGT TTCCATATTT CCATAAAGAA CAAGAAAACA AATAATCTTA  
23651 ATGGATATAT AATGAACACA CAGATGAAAA TTTCCACTGC CATGCCCTTG  
23701 AAAAAAGATC CCTAGCTACT TGTATTTTCT CTTATATTTA AAATCAGTCT  
23751 TTTCACTTAT GTTTTCTTCA GATCTCTGT TTTGAAGTGT ATATAGATAT  
23801 CAACATAGAA ATGCAGGTGA TATTGCTATC AACTGCAGTG GAGCAGTAT  
23851 TCGTAGGTTT TCCAACATCC TTGCCCTTAA CAAACCTGCA AAATCAAAGT  
23901 GTGAGCTAGC TCTAAACAAT GGGAGAGGCT TTTTTTTTTT TTTTAAGAGT  
23951 TAGAACTAAG ACTCTCACTT CCTCTGTGTC CTCACATTTT TTGACCTTCA  
24001 CATTTGGGCC CTGCATCAGA ATACAGCACC CCTAACAGG CTCCTGTCTA  
24051 GCACCTTTTC TCTGGAAATA ACAGATGTTG TCTCTAGAGC TGCAATAGAAC  
24101 CTTAATGGAA TCATTGTGGG TCAGAGGCCC TGGATGGTGC TGGGGACCTC  
24151 CCTGACCCAC AGCATCTGAC CCACATTTCC AGGTTCTTAG CGACTTGTGT  
24201 CAGTAAAGAA AAAGGCACAT AGCTAAGTGG AAGAGCAGAT GAGGCTTGGT  
24251 GGGAAATCAG CAGTGGTCTG CCTAGCAAAA GGTAAACAGA ACTGCTGGGG  
24301 GCTTTTGGTC CTAGGCTCAC TACTCAGGGA GGCACCTTAA CATGGAATGA  
24351 CCAGCAAGTT TCCCTCTTGA TCTTTTCCAC CACCACCACA AGCCTAGTAC  
24401 CTCCTCCCTT CTTTGTCTTG TTGCTCTCTT CGGGAATGCA CTGGAAACCA  
24451 CCTCAGTTTC TGTTTGGAAT TTTCTTATTC CTTATTCAGA AAGAGGAAGA  
24501 AGCTTTTGCA TTACTTCCAA CCGTTCTACC TATTAATCCC ATAAACTTTC  
24551 TGTGATCTCA TATCATTAGG CCAAATGTTA ATCTTTCTGG GAGCCAGGAG  
24601 ACTGCTTTCA CATTCAGAGG CCTGGACAT ATAGGACTGC CTCTAACTCA  
24651 CTCTAACTCA GCTTATTTGAC TTGAATGCAC CTTTTTAAAC AGTGACTAAA  
24701 AAACAACCTG TGACTATTTCT CTGAAAATGA GCTATATCTT CATACTTATT  
24751 TATTCTGTGT AACACTGTGA AACAAATTA AATCTCTGGC ACTATGTATA  
24801 TACCATAAAA AGCTTATTTG TAAGCTACTT AATTGGACCA GTTTTGACAA  
24851 TATTGAATTA GCACTAATTG CAGATCATTA TGTAGAAATTA TAGGCTGCTG  
24901 AGGAAAACAA TATCACACCA TTTGCTTTCC TCAGTTTCTT TTTCAGAAATG  
24951 AGTTTCTATA TGTTCACATA TCCAATTTT AAAATCCTTT ACAAGATAT  
25001 TCTTAACTTA TTTCCAGAGA CTATCTGGTT TGTCAATTTA GAAATGAAAT  
25051 TGCTTTTCTA GCCTAAACAG ATGGCCTTAA TTTTGGTGG AGTGGTATGA  
25101 AAGGAATGTC ACATGAGAAA CTGCAAGCTA TTATGCTTGA ATTTTGTGTC  
25151 ATTCATACAT GTTTCAAAAT ATATTTTACA TTTTCTCTCT TTTAAATGAG

FIGURE 3H



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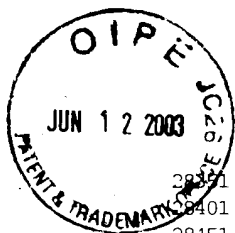
Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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TECH CENTER 1600/290

252501 TTCCCATCTC TGCACCTTAA GTGACTTCAG AACTAAAATT TTAAAGTGAA  
25251 CATCAATCAC AGCAITTTCCA AAAATGTGAA CTCTAGCTT AACCGAAGTA  
25301 TTCACITATT GGAAAGCTGA TAGAGTAATT CCACTAAGTC CAAAAAGTGT  
25351 CCTCTAAAAG ATTCCAAAGA TAAGAGTGT TTCAACTTTG TCAAGCTGTA  
25401 CAAACACAAA TGTCACTCCC TCCCCTTGCC CACAGGGATC TTATCCAGT  
25451 TACAGCAGCG TAACITGAGC AGCTGCTGCA AACTGAGGCT CTCTTGACCC  
25501 TTGGCTTACT TATTTGAGCT GCTAAAATAG GGCTGAAATC TGTCAAGGAT  
25551 CCTGAAGGGA AGGATAAGAT TCCTACTATT CAATTTAATT TAAGCTTTTA  
25601 TTCAGTGCCT GCTGTGTGCA CAACACTAAG CTAGAAAGTC TGAGGAATGT  
25651 TTAGATTATT AGGTCCCTGT CCTTGCCCTT CATAGATTTA CAATCTATTG  
25701 ATAGGGAGAG CTAAAAAGGA GAGAAAGAGG AAGGAGCAAA CATAAAAACG  
25751 TCAAAATTTT AAAATACCAT TTTAAAATTT TATTTTAAAA TGTTAAATAC  
25801 CATGCAAAAT TAAGGAAAAC CTAGATTTCAT AAAAATTTCCT TTCACAACTC  
25851 TGTGTAAATC AATTCACTGC TTGCCCTTAA TGTCTCATCC AGTCTGATGA  
25901 GACATGTTTT GTGATCAACA AGGGTTTTAC TATGTTTCTT AATTATGTGT  
25951 CTTGCTGTGT ATCTCTTTCT GACCGAGATT ATTTTAAACA ATAAATTCCTG  
26001 AAAACTAAGA AAGTGAAAGC ATAAAATATT GTCTTATAAA ATACGCCAAG  
26051 GAAAAATGA CACTCCATTT CAAATATCAA AAGTTAGCAT CAAGACTGCA  
26101 CAAGATGAAT GTACAGTCAT GTGTGTCTTA CAAATGTGGA CATATTTCTGA  
26151 GAAATGCATC TTTAGGCAAT TTGTGCTATG TGCAAAACACC ATAGATTGTA  
26201 CTTGCAGCCT AATTGGTGGG GCTACTATA CACTAAGGCT ATATGGCATA  
26251 GCTTAGTACT CCTAGGCTAC AAACCTGTAC AGCATGTATC TGTACTGAAT  
26301 AGTGGAGGTA CCTGTACAT AATGGTAAGT ATTTGTGTCT CCAACGTAAG  
26351 AAAAGCTACT GTAAAAATAC AGTATTACAA CCTTAGGGTA TCACGTGCTT  
26401 ATATGTGGTC TGTGTGTGAC CGAAATGACT ATGCTTAATA CCACCTGAAT  
26451 GTACACTTAA AAATGGTTAA GATGGTAAAT TCTATGTTAT GTATGTTTTA  
26501 TAATAATAAA AAAATTGAAA AAAGCATCAA CATCTTTTCT GGGAAAAAAG  
26551 AAAAAAGAAAG AAAATGCATT AGAGTGATGA GAATATTTGA AGTAATAGAT  
26601 AAAGTCAAAA ACAAGAAGAT GATCTTGCCCT TTGAACCTTC TTGTTTAAAG  
26651 TTGTACATC AGTGATCACA CTGTATTTC CCAACGACC CTTACGCTGG  
26701 ATACGACATT TCCGATGTC AGCTGTGCTT ATTGCACCTA ATAAATGTTCT  
26751 GGTATCCCTT GTGCCAACTA TAAATACAT CTTGGATTTC ATAGGTGAGT  
26801 TTCAGAAAGG CTTCAATTIG GTCAACCCAA ACTCAGCCT CATTAATGA  
26851 TGGACAGGGA ACCAGTGCTG GGTATCCAG ATCCCGTTTC TTTCTCAGGC  
26901 TCATGGATTG CCTTTATCCC TGCGAGGCTC TGGTGATTGA GCTGCTCACT  
26951 GTCTCTTCTT CCTAAGTAC ACTGGGAGCC ACCTTATAGG TCATTTAGTC  
27001 AAGCTGCTTT TCTGATAGA TGAGGAACT GACCCCTATA AAAGTCAAGT  
27051 CATATACCTT GGTGTGGACC CAGGATTTGG ACTTAGGTAT TAGCTCCACC  
27101 ATCAGGAAA GAGGAAGATA GATTTTACCT GCCAGAAGCT CTCTGATACT  
27151 ACGAGTATCA GCTGAACATT GAAAGGTATC TTCAGAGGAA TAGGAGGTG  
27201 ATTATATAAA GTGTATTATT AGTATTTCCC CATAACTGCA TGGTCTATTA  
27251 ATTTTCATTC TACTCATTTA GGGTTTACTT AAACCTTAAA CACAATCTAA  
27301 AACTTTAAAA GAACCATGGG TAGGTACATT GCAAGTAAAG AGGTGGATAG  
27351 GGTGTGTGAT GAGTTCAGCC ACCTTAGTAT GTATTTATAT TACTAATCCC  
27401 CTGTAAATTT GTGTAAATTT CAGCCTTTTG TTGCTTATTA TATGTGTCAT  
27451 ATACTTATGC AGCTTTGATG TTAGGTACAT TTTAATTGTC TCTATAAACA  
27501 TATCTTCTAT GAATAAATTA CCAAGATGAG CTTATGTGAC TTAAGTGTGT  
27551 GTTTTATAG CTAAGTATAG GATAGCTTTA TATTTGGTTT ATTTAAAGTG  
27601 TGTGCTGGCA TCTCCTTTGC TAGGAAGTGC TGGTAAAGAC ATTGACCTTG  
27651 CCTGTGTTTT GTCTTCTCAG GGGCTTCTTC TGCCACTATG CTGATTTTTA  
27701 TTCTTCCAGC AGTTTTTTAT CTTAACTTG TCAAGAAAGA AACTTTTAGG  
27751 TCACCCCAAA AGGTGGGGT AAGTAAACCT TGCAATTTCC CCCATTATTA  
27801 GTGTGTCTTC CAACTACTTA GAATAAACTA GAAATACAC ATAGTTTACA  
27851 AAAATGAATC AATGTACAAG AACCAAAAAT CAAAAATGGG CTAGAAGTTT  
27901 CTGTTAGCAG AGAAAGGGGA CATATTTCTG AAACCTCAAAT GATTCTACTT  
27951 CAAATATCAA ATATCCTGTG TTGAGTCTGT CATACATGTC AAATAGTAGT  
28001 AGCCTTTCCC ACAGACACAT ATGCTTCAGG CAAATAGCAG TGTCCAATAC  
28051 CAGCTGCTG TTGTGCTATC CGTGAAAAT CATGCAAGAA GGAATTAGGC  
28101 TCCCTAGCCG TGTATGGAA TAAITTAAT ATTTTGGTCA TGGTGTGTAG  
28151 GTTTGCAAG CCAAGGAAA GATGTGCTT TTGTTTTCCC TTCCATAGTA  
28201 CCTGTGTGTC CTGGTGTGGA CTAAGATCCA GAACAGAAC ATTCACTGTT  
28251 CTGTAAACCT CTTTAGATAC AAAATACAGT CTTATTAAT TAGAGAGTAC  
28301 ATATTTCTTT TCATAAGAC TACTATAGAA ACAAATGCTA GAAATAATTG

FIGURE 31



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Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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28441 TTTTTOCAAT AAGGAAATAT TATCTTTCAC TCCTTAATAA AGTCATGTTA  
28401 AGGCTTGAAA AGAATATTTC TTACTGAATT ACTCTGAATT TTACCTTGA  
28451 AGTCATTTAC CTTTGGGATG TTCTGGGGAC TTCAGGATAA TTTGGTATCA  
28501 AAAGGTCCAC CCAGCAGCTT GCTCCCAAAT TTTAACTCTA TGTAGTCCGT  
28551 CTGTGCTTGA TTTTITACAGC AGTGTGACCT TGGCAAATTA CTGTGCTCTG  
28601 TTGTGACCTA TTTTCAGTTT GACCAATTGT GAAATGAGTA CAATTATCTC  
28651 CTAGACCCAT TCTAGTGAAA AATGTTTAGT TGCTGCTTTC TTATATGTAG  
28701 GATTAGGAGG TTTAAGTATG TGATAAAATG TAAGGCTCTT TCTGGTGTGA  
28751 AAATGCTGAA GTATTTTATA TGTAGGTATG TACATATATC CTATATATG  
28801 TGTGTGTATA TTATATGTAT GCACACACAC ACACACATAT ATACACTTTT  
28851 TGTGTCAACA TCTATTAAAC TTTTGGTTTT GTTTGCTTTA TAAAATTAGA  
28901 ATCATATCAT ATATGCTATT CTTTTTTTAA CTGCTCTTTT TCACCTAAAA  
28951 GATTGTAAGC ATTCTCTAGA TTATTGAATC TTTTTCGTTC CCTTGATTTT  
29001 TAATAATCAC AGGGTATTCC ATCATCTTGG TGTACTAAAT CAATTAACCTA  
29051 TTACTTCATT GTTGAACCTG TAGGTGTGAT CTCTCCACTG TATTCTCTTT  
29101 CTTTCTTCAA CTAGGATTCT AAATTGACTG ATAGGTTAGG CCTGGGCATC  
29151 TGAGATATTA AGAATAATAT GGCTCAATAT ATAGATCAGA TTGCCATATT  
29201 ATGTAAACAA CTAATAAACAA AATTGTACTA AGTATGGTTT CTGTGCTCCT  
29251 AACAGAGTCT CTCTGAATTA CAGGCTTTAA TTTTCTTGTG GGTGGGAATA  
29301 TTCTTTAAGA TTGGAAGCAT GGCATTCATT ATAATTGACT GGAATTATGA  
29351 TCTTCCAAAT TCCAAGCATC ACTAACACAA GGAAAAATAC TTTCTTTTTT  
29401 TATTGAAAAT GGTACAAAGT TATACTCCAA AAGATATTTG AATTATCTTG  
29451 ATTGGAATGT TATTTCATAGG AAATAACAGG AAGATTCCAA AGACGTTTAC  
29501 CAGTAATATC ACCAGGCACC TGCAAGAGAG GAAATCACTT GTTTTGTGCA  
29551 AGGATGGTTG TGTATGTGTT TAAAAATAAA CCTGTGGTGC ACATTTCTAC  
29601 CCAGGTTTGG CTAGAGCAGT GTGAGATGAT GAAGGTGTAT TTTTGTGCT  
29651 TTACGAGCAG AATAAGGTA ACTGCATGTA ACAATCATCA GATAGTACTC  
29701 TTTCCCTTGC CGTCTCTCA TCTTGCAACC CCTAAAAAG TACCAACAT  
29751 TTGCATCTC AGAACATCAA ACAAAAATGC CCTGGTGGCA AAGCTATCAC  
29801 CATTTAATGT CTCTCTCAG TCTTGACCA AAGTCTCTGG TCTGTTTACT  
29851 AACAGAGGCA AAAGGCATGT CTTAGGAAGT GTTCTGTGTT CTGTAAAGTA  
29901 CATGAATGCT CAAACACCAG TCTAGAGCAT CTTATGTGCA ACAGCAAAAT  
29951 AATATTTTGC CCACCCGTGT TGTGACATTG AGTTGTGACT TCTATATTCA  
30001 ATAGATTTTT GTAAATGTGA AAACATCTAT ATTTAAATGT TAAACACTA  
30051 AATATAGAGA GGGGCTTTAT TTCAATCATA GAGCAACAC AAAAAATAATG  
30101 CTTATAGCTA AACTGCTGT TCTAGAAAGC ATCTGCTTTT TCAITGTATT  
30151 CCTAAATCCT CTGTGCATAC TTTTGTCAAT GAACAATGCT CTCCCTCTCG  
30201 TCTTCCATCC TCAITCAGAA TTTTITAGAAG ACCCAATCG TGGAGATACA  
30251 CTACCCAGTA TTGTITGATA CATTTTTATT TGATAAACAT TCAGTGCAGG  
30301 AAACITGTAT TTGCTATATG TTTATGTATA TAATCTTATT CTGTAGTCAT  
30351 CAGAATGTGA ATGTAAAGTA CATTGTATT TTTATTTTIA CATGTGTAGT  
30401 TTTCTTTCTT CACAGTCAAA GCATTTATAT TATTGGGGGT GGGGCGAGG  
30451 AATTAAGTTG GTGGGCTCGA AAATCCATTC ATATGTATCT GTCTACAAAT  
30501 GTCTGGGGAT AATTTAAATT TGAAACCTAA GTTATATATA GTTTGGCAAT  
30551 GCTCTTCTTC AATATTTTACA ATAATAGGAT GATCTACAAG AAAATAAGTT  
30601 TCTTTTGTGA AATTTTATC ATACTAAAGT TGTCTTTTIA ATTTAGCATA  
30651 TCTAAATAG GAATTAGTTC AGTTTAGCTC ACACAGGTGT TTGCTGACAT  
30701 TCATTGGCCA TTTAATACAG TGTGTAGTGG TTCTCGTAA AAGTATAAGT  
30751 GCTAACACTA CGAAGAAATG CACACGATCA TTCTTGCTCA CTCTATAAC  
30801 AAACITACAT AAAATGGATT TAAAAATTC TACTCACAGC CTAAACITTC  
30851 TGGAGTTCAC TACCTTTTTT TCAATCATA GTAAGATCAC TTGTGTATTT  
30901 TATATTTTAG TAAAGCCAAT TATGAAGTAC AAGTATCATA CACGTACTTT  
30951 TGAGCTACTA TTATTTGAAA AAAATCTGCC AAATAGCATC TTTAGGATAT  
31001 ATTTACATTT TCACTCATCT AAAAAATATA CAAAAATAAA AAGTGGAAAA  
31051 AGGTATCTTC TGAATGTGCA AGAGCATCCT ATAGTGCCAA ATAATAAGC  
31101 ACCATTTTIT TCTTCATAAC CAGGATTAAA ATTCTATAT ACTGCAAGGC  
31151 AGACATACAT ATGATAGCTT GTGCTGATTA ATTTAACCCO ATTTGTAAAC  
31201 AGATGAAAT TTTATTTTCT TATTTTCAITT ATAAGATGGC TCAATGTATT  
31251 GGGAGGCTTC TTTTITATTA CAGAAAGTGT ATATTGGTAT ATAATAAATG  
31301 AACTTTTCAA ATGACTATGA TGTGATTTT GATCTATTGT TAAAGAATGT  
31351 TGTGTATTTT GTCCATGAAA CAAAATTTAA AATCCAAATA CTGTCTTTCT  
31401 TATATTTGTT TATGTTCCAT TTTTATGTT ACCTTTGACA CATACTAAC  
31451 ATCTATAGCC ATCATCTGA AAATAATTGC CATCTTATTT TGGCAAAATA

FIGURE 3J





Docket No.: CL001010  
Serial No.: 09/776,705  
Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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31501 GATATTTAAT CCTAAATTAT TATGATGATT ATAATTTTGG CATCACAAT  
31551 ATACCACCTA GAATGAATGT GGAAGAAATG AGTCTTTTAT GGTAGATTG  
31601 AAAGAATCCA TTGAAGATAG AAAATGAGAG AATAGAAGAA ACCTGAGAAT  
31651 AGTAAATATA AGAGCAGAGA AAATATGGGG GCAGGGAAAA CATGTGAGTG  
31701 CTAAGGATTG ATTATGAATG AACGATTAGG GGGATTGATG GATCACAGGG  
31751 TAAGTATATG CTTAACTTTA TAAGAAACTT CCACATAGTT TTCCACAGTG  
31801 TTTCIACCAT TTTCATTTCC ACCCGTACTA CCTACAACIT CCACAGACTC  
31851 CACAGCCCTG CCAACATTTG GTGTGTCTTT TTGCATTTTA GCGTTTCTAG  
31901 TGGGCTGAA ATGGTAACTC ATTGTGATTT TCATTTCTGC TTCTGTGACA  
31951 ACTAATGTTG AAAACTTTTC AAGTGTTTAA TGGTCACTCA TATATCTTCT  
32001 TTGTGGAAGT GTGTATTCAA ATCTTTTGCC CATTTTITAA ATTTAGGTTA  
32051 TGTGTTTTTA TTGGGATTTT GTAGAAGCTC TTTAAATATG GATCCATGTC  
32101 CAGATTGCCA ATATATTTTC CCAGTCTATG GTATGGTTGC TTATTTTCCT  
32151 AAAGGTGTCT TAATTACATC TTCTGGGGC CAGGTACCA TAGCTCAAG  
32201 TTTTGCAATT TATGTCTTAA TGAGATAATA TTAATCAGAG TGGTATAGTC  
32251 AAAATTAATG GTTTTGATGT CCTGGGCCA TATAGGTAGG ACTGGATCAT  
32301 CTAACCAAGA TGCAAAAAA AAAAAACAAA AAAACAAAAA TAGTACTTGG  
32351 AAAAATTAT TTTAAATTAA ACA (SEQ ID NO:3)

**FEATURES:**

Start: 3000  
Exon: 3000-3118  
Intron: 3119-7452  
Exon: 7453-7543  
Intron: 7544-8039  
Exon: 8040-8155  
Intron: 8156-10894  
Exon: 10895-10968  
Intron: 10969-11437  
Exon: 11438-11530  
Intron: 11531-16047  
Exon: 16048-16129  
Intron: 16130-16215  
Exon: 16216-16298  
Intron: 16299-16408  
Exon: 16409-16467  
Intron: 16468-17301  
Exon: 17302-17577  
Intron: 17578-17709  
Exon: 17710-17789  
Intron: 17790-19073  
Exon: 19074-19174  
Intron: 19175-20904  
Exon: 20905-21029  
Intron: 21030-26649  
Exon: 26650-26794  
Intron: 26795-27670  
Exon: 27671-27768  
Intron: 27769-29273  
Exon: 29274-29372  
Stop: 29373

**CHROMOSOME MAP POSITION:**

Chromosome 12

**ALLELIC VARIANTS (SNPs):**

DNA				Protein		
Position	Major	Minor	Domain	Position	Major	Minor
1386	T	C	Beyond ORF(5')			
2594	T	C	Beyond ORF(5')			
2757	G	T	Beyond ORF(5')			
6107	C	T	Intron			
6392	T	C	Intron			

FIGURE 3K



Docket No.: CL001010  
Serial No.: 09/776,705  
Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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9484	C	G	Intron			
10280	A	G	Intron			
10297	G	A	Intron			
10331	G	A	Intron			
10536	T	C	Intron			
11548	T	C	Intron			
11917	G	T	Intron			
12840	T	-	Intron			
12844	A	-	Intron			
12847	T	-	Intron			
13019	C	-	Intron			
13022	A	G	Intron			
13285	G	A	Intron			
14461	G	C	Intron			
15464	-	G	Intron			
15469	-	A	Intron			
15545	T	C	Intron			
16199	T	C	Intron			
16798	T	C	Intron			
18103	C	T	Intron			
18421	A	G	Intron			
18528	G	A	Intron			
18722	T	C	Intron			
18775	C	G	Intron			
18951	T	C	Intron			
18974	T	G	Intron			
19540	A	C	Intron			
19841	G	A	Intron			
20170	A	C	Intron			
20343	T	C	Intron			
20519	G	A	Intron			
20963	T	C	Exon	411	P	P
21840	G	T	Intron			
22783	C	T	Intron			
22787	G	A	Intron			
22825	T	C	Intron			
22967	A	T	Intron			
23248	A	G	Intron			
23764	G	T	Intron			
23765	C	T	Intron			
24432	A	G	Intron			
24538	C	G	Intron			
24693	T	C	Intron			
24819	C	T	Intron			
25743	C	T	Intron			
26044	G	C	Intron			
26555	G	A	Intron			
27886	A	C	Intron			
31884	T	C	Beyond ORF (3')			
32229	T	A	Beyond ORF (3')			

Context:

DNA

Position

1386 ACCCATATGCATGCTTACCTTCTATTCTCTTTAGCTTTTAACTGCTTCTTTTCATCTT  
TTATGATATATACATTAGGCTGCCCTATATTAATAATAGTTTCATTTTGTTCCTCCTGC  
TTAAACACTGIGTGCTATTTTAAATTCGAGAACTGCTTCTTTATTCTAGACAA  
TTCTCTGCCATTATCTCTTCTGTTTGTCTCAACCTAGCTCACAATTCCTATATTGG  
AATGACTATCAGTGATATTTGAACCTGTAAATTCCTATTTTTCCTTCTCTTAAGT  
[T,C]  
CTTATTTGTATTTTCTTTTAACTCTCTCATGCTATAATTTGAGTGATTTCACAGA  
TCTGTCTTCAATTTATAAGCTCTCTTCAGCTGAGTTTAAATTTCAATGATTCT

FIGURE 3L



Docket No.: CL001010

Serial No.: 09/776,705

Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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TECH CENTER 1600/2900

2594

ATTTTFTTCTTTTFTTAAAGATTCCTTTTGTGACCTTTTGGCAACAGCGTGTCTCC  
TTTTATATTCCTTTATAATGTTTTTATTCGTGAAAGTTATCTCTTATTTTGAATGTTT  
TCTTTCAAATGTCCTTTTATTAATTTAATGTAAAGTCCCTTTTAAATGTCTTTG  
(SEQ ID NO: 24)

2757

CTGAACCTTCTTTTGTACTATCTTAACCTTTGGCTTCAGGATCCAGTGCCTAGAAAGT  
TACTTCCATAAAGTTGATCTCCTTACCTATGTTGCATATTATCAAGCATTGGTGGTGTAAAT  
TCTTTTCATGTCCAAATTTAAATTAAGCAGTAATTTCTTTCTAGTTATTGCTAGTAGAGAC  
ACTGGTAGATTCTGCTTGGTAGACCTTCTCTGTCAACAATTTACTTTTGTCTTCTTTT  
CTTTTAAACATGTATCCCACTCACAATACCTAAATTTCTTGAAGACTGCTGCCATGT  
[T, C]  
TTAAGATTTCTTTTTCATAGTACTAGTAAACCTGCCATTTTCATTATACATAG  
GCACCTATATAATATCTGCTAATTTAGCAATTATAGTAATTTCTTTCTCTCTTCCAT  
TCTTTCTCTTCTTTGATTTGGGTAAAGGAACATTTTCAGGATTGCTTATGTAAAGTTTCA  
GGAGTTTCTTTCTTCTTCTTCTTTTACAGAGAGCATACAAATGTAGATGATTCATATTC  
ACTTATTTCATTTAAATAAAATTTATAATGATGTATGTGTGTCTGTTTGCAGAACAGAG  
(SEQ ID NO: 25)

6107

TATATGCTAGTAGAGACACTGGTAGATTCTGCTTGGTAGACCTTCTCTGTCAACAATT  
TACTTTTGTCTTCTTTCTTTTAAACATGTATCCCACTCACAATACTAAATTTCTTT  
GAAGACTGCTGCTATGTTTAAAGATTTCTTTTTCATAGTACTAGTAAACCTGCTC  
CATTTTCATTATACATAGGCACCTCTATAAATATCTGCTAATTTAGCAATTATAGTAAT  
TCTTTCTCTCTTCTTCTTCTTCTTTCTTTGATTTGGGTAAAGGAACATTTTCAGGATT  
[G, T]  
CTTATGTAAAGTTTTCAGGAGTTTCTTTCTTCTTCTTCTTTTACAGAGAGCATACAAAT  
GTAGATGATTCATATTCATTTTCAATTTAAATAAAATTTATAATGATGTATGTGTGT  
CTGTTTGCAGAACAGAGTGTCTGAACATCAACACAAGTGAAGAACCTTAAGCTGAAG  
GTACAGTATATTTTACACTGAAGGGCTTGTGTGTGACAAGAAAGCGCTGACAGCTC  
AAATGGATCCCATGGAAGTGAAGAAATGTCAACATCGAACCAGATGATGAGAGCAGCAGTG  
(SEQ ID NO: 26)

6392

GTTTGTGTGTCTGTTTCTATCTACATCTCATACGTTTTCTATTCTCAAAAAGTAAACCT  
GTATCTCTCTTCTCTCTCCAGATTATTTTCAGGATTAGCTTCTGTATATAAAATAGCTT  
GTACAGATCTCTTACAATAATTTATTTCTATTTTATTTCTAAGGTTTATTTATTTATTTA  
TTGAGACAGACAGAGTTTCACTCTTGTGGCCATGCTGGAGTGCATGGTGCATCTCGG  
CTCACTGCAACCTCTGCTTCCAGGTTCAAGCGATTCTCTGCTTCAGCTCTCTGAGTAG  
[C, T]  
TGGGATTACAGGCGCTGCTGCAACCACTCGGCTAACCTTTTGTATTTCTAGTAGAGACGA  
AGTTTCAACCATGTTGGCCAGGCTGGTCTTGAACCTCTGACCTCAAGTTATCCACCCACT  
CAGCTTCCCAAAGTCTGGGATTACAGGCGTGAGCCACTGTGCTGGCTCTAGGATTAT  
ATTAATAGAACATCTTCAATTTATTTATCTTTCTTTATCTTTCTTTTATGTAGGAAAT  
GTCTTAAATTTTCAAAACCTCAATTTGAAAGCACTTTTAAATCATACATAGTGCAGCA  
(SEQ ID NO: 27)

9484

CAGCTCTCTAGTAGCTGGGATTACAGGCGCTGCCACCACTCGGCTAACCTTTTGTGA  
TTTCTAGTAGAGACGAAGTTTCAACATGTTGGCCAGGCTGGTCTTGAACCTCTGACCTCA  
AGTTATCCACCCACCTCAGCTCCCAAAGTGTGGGATTACAGGCGTGAGCCACTGTGCT  
TGGCTCTAGGATTATATTAATAGAACATCTTCAATTTATTTATCTTTCTTTATCTTTTC  
TTTTCTATGTAGGAAATGTCTTAAATTTTCAAAACCTCAATTTGAAAGCACTTTTAAAT  
[T, C]  
ATACATAGTCGAGCATTTTATATAAAACCACTAAAGTCTGTGACATTTTGCAGTATA  
AAAATGCAATGGCAGCAGCAGGCTTATTAATTGAGCTCTTGGAAATGTGGCTGGTCTCT  
AGGTCCGTAGCTTCAAGGCGCTGGCTGTAACTGCAGGAGCTGACCAGCAGCTCTAT  
AACCAGTGTATACCTTTCTAGCTGTGTCCAGAAACAGAAATCACAACGCTCTGTGG  
ATAGTGACATCTTAAAGTTTCTTTTCCCTCCCACTCTTTTGGCAGTTCAATTGAATGTCT  
(SEQ ID NO: 28)

FIGURE 3M



Docket No.: CL001010  
Serial No.: 09/776,705  
Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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- CTGCCCTTCCTTATTAAATTATACATACCATTAATAATGAATTAGGAAGTTACAGATCACTG  
ATGAATAGAAATAGGAAAAACITCCCCCAATCCACAGTCATAGATCATCTTCATGAGAG  
AAGAATGTTCCACTTTTAAAAATGAGGGCTCATTTTAGGCTTATAAACACTTAGCAGAT  
GAATTGCTGAGAACAAATTAATCACTAAACATCATGGGGTGTGTTTTGTGTGCTTAAGT  
AGCCGAGCTGGATTAAAGCTTTCTCTCTTAATTATAGCAAGTGACACAGTATTTTAAAG  
(SEQ ID NO: 29)
- 10280 ATAAGAGTGCAACATAGCTACAGGGGTATATAAAATTTATAATTTCATGGTCCAAATGTACA  
TTTGTAGTATTGATTTTCATTTGGGAATTACCAAGGGATTAGATCAATTGTGGGAAAGTGT  
ATTTTTTAAAAATAAACAAAGATAAAGATTTTTTTTCTGAATTCAGGTAAAAGGCAGCA  
TTGCTCTCCATTTATACGTAGATGCTTCTATCAACATCTTATTTTGTGCTCCAAAT  
CTTGGATTTGGAAAAATACCAATCCGTATAAACATAAAGAAACCATACATGTCATGTGGG  
[A, G]  
TCTTAACACCAGAAATGACTCTGAATGCAAAAAAAAAAAAAAAAAAGGAATTTTC  
GTGCCCCATCTTAGCTTTCTCTGCTTTCTCTATTATATATGCAACTGCCCTGCCCTCTA  
TCTTACAAAGTACTTCTTAATCTAATGCACAGGATCAGCAGTAATGCAGCTCAGACTGCA  
TGCTTTGCGCTTTGGATTCTAGATTTAGATTAAGGTTTAGTCAGGCTATTGAATAGCC  
CTTCAATTTCAAGTCTGATGTGAATATCATGCAATATGATGTACATATTTCCCATGTGC  
(SEQ ID NO: 30)
- 10297 CTACAGGGGTATATAAAATTTATAATTTCATGGTCCAAATGTACATTTGTAGTATTGATTTT  
ATTGGGAATTACCAAGGGATTAGATCAATTGTGGGAAAGTGTATTTTTTAAAAATAAAC  
AAAGATAAAGATTTTTTTTCTGAATTCAGGTAAAAGGCAGCAATGTCTCTCCATTTATTT  
ACGTAGATGCTTCTATCAACATCTTATTTTGTGCTCCAAATCTTGGATTTGGAAAAAT  
ACCAATCCGTATAAACATAAAGAAACCATACATGTCATGTGGGATCTAACACCAGAAAT  
[G, A]  
ACTCTGAATGCAAAAAAAAAAAAAAAAAAGGAATTTTGTGCCCCATCTTAGCT  
TTCTCTGCTTTCTCTATTATATATGCAACTGCCCTGCCCTCTATCTTACAAAGTACTTCT  
TAATCTAATGCACAGGATCAGCAGTAATGCAGCTCAGACTGCTATTTGCGCTTTGGAT  
TCTTAGATTTAGATTAAGGTTTAGTCAGGCTATTGAATAGCCCTTCAATTTCAAGTGT  
GATGTGAATATCATGCAATATGATGTACATATTTCCCATGTGCTGAGTAAGTAGATGTAG  
(SEQ ID NO: 31)
- 10331 AAATGTACATTTGTAGTATTGATTTTCATTTGGGAATTACCAAGGGATTAGATCAATTGTGG  
GGAAAGTGTATTTTTTAAAAATAAACAAAGATAAAGATTTTTTTTCTGAATTCAGGTAA  
AAGGCAGCATTTGCTCTCCATTTATACGTAGATGCTTCTATCAACATCTTATTTTGT  
GCTCCAAATCTTGGATTTGGAAAAATACCAATCCGTATAAACATAAAGAAACCATACATG  
CATGTGGGATCTTAACACCAGAAATGACTCTGAATGCAAAAAAAAAAAAAAAAAAAAAA  
[G, A]  
GGAATTTTGTGCCCCATCTTAGCTTTCTCTGCTTTCTCTATTATATATGCAACTGCCCT  
GCCCCCTATCTTACAAAGTACTTCTTAATCTAATGCACAGGATCAGCAGTAATGCAGCT  
CAGACTGCATGCTTTGCGCTTTGGATTTCTAGATTTAGATTAAGGTTTAGTCAGGCTAT  
TGAATAGCCCTTCAATTTCAAGTGTGATGTGAATATCATGCAATATGATGTACATATT  
CCCATGTGCTGAGTATGATGTAGCATTTGCTAATGTTGCTATACATTTAGCATCTAA  
(SEQ ID NO: 32)
- 10536 TACCAATCCGTATAAACATAAAGAAACCATACATGTCATGTGGGATCTAACACCAGAA  
TGACTCTGAATGCAAAAAAAAAAAAAAAAAAGGAATTTTGTGCCCCATCTTAG  
CTTTCTCTGCTTTCTCTATTATATATGCAACTGCCCTGCCCTCTATCTTACAAAGTACTT  
CGTAATCTAATGCACAGGATCAGCAGTAATGCAGCTCAGACTGCATGCTTTGCGCTTTGG  
ATTCCTAGATTTAGATTAAGGTTTAGTCAGGCTATTGAATAGCCCTTCAATTTCAAGT  
[T, C]  
TGATGTGAATATCATGCAATATGATGTACATATTTCCCATGTGCTGAGTAAGTAGATGTA  
GCATTTGCTAATGTTGCTATACATTTAGCATCTAAGTTATGAACCAGATTTCTACCACTGG  
GTAACATTAAGGATTTAGGGACTTCAGGTATGTAAAATATAGCAATTTCTATTTCTA  
CGACTTTAAAGGGTATGTAGAGTTCTGAAAAAGAAATTTCTCAGCTCCCCCAATCCAC  
ATACTTTGGAAAGCTGATGATTGAAAAGATTAATGTGATCTTTTATTTGAACATCTAAC  
(SEQ ID NO: 33)
- 11548 ACCATGTATCTTGTGTGGAGAACATTTTGATATATTGCTTATTGGTTTTTGGAGTTGCA  
TCTTTTGGGCTTATAAATTTCTATATGATGTTTATTTACATGTTTGGAGCTCCAGCATGGA  
ATATATAGCAAAAAATTTTGTGATTAATAACATCTCTTTAACAAGGCTATTTTATCT  
TTGATTTAGGGTCTTTGATTTATGAAAAATTAGGAGAAAGGCATTTGGATGGCCGGGA

FIGURE 3N



Docket No.: CL001010

Serial No.: 09/776,705

Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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- AAAATGGAGCTTTTGTTCATTCACATGCAGAACATGGAGGTAAGGGATATACCTT  
[T, C]  
CAATGGATCCCATAACTTTCTATAGCGTGTTCATAAATAAGAAAACCTTATGGCAATAA  
ACAGGCACCTTTAGATACAGAAAAATGCTACTTATAGTTCCTTAAATTTTAAATGATAGT  
TTCTTAAATAGGTTTGTGTCTGCTTTAATTAACACAGCAATATCTAAGAATGAAATAA  
CATATAAACCCCTGCCAATTGAATTCTAGAATTAAATATAAAATAAAGCTTTCTTGAT  
TTTTAATGTTATATAGCATGAATTATTACTCTTAAAAATTGAAGAATTGTGCTTATAT  
(SEQ ID NO: 34)
- 11917 TTTAGATACAGAAAAATGCTACTTATAGTTCCTTAAATTTTAAATGATAGTTCTTAAA  
TAGGTTTGTGTCTGCTTTAATTAACACAGCAATATCTAAGAATGAAATAACATATAAA  
ACCCCTGCCAATTGAATTCTAGAATTAAATATAAAATAAAGCTTTCTTGATTTTAAATG  
TTATTATAGCATGAATTATTACTCTTAAAAATTGAAGAATTGTGCTTATATCTGTCAAT  
GACAAAACAGTTGACGTTTCTATGTGTGACTGAGTTGAGTTTACTTAACTGAAAAGTGG  
[G, T]  
TGTCTGGGGGAACATAGCCAAATGCTGTGGTCTTGAACGACGCTGCCTGAGCCAGC  
CCACTAGACAGTGTCTCTGGAAGTTTACTAAGGCAAAAGTCTGGCTAGGCATCAAATGCA  
CTATAAACCCCGGTTTGTGATTTCTATGGATTCTTATAATTCCCACTGAATTATCATTTT  
CAGTGTAGGACCTAGAAATATATATATATATTTTAAACAATGTTCTCTGTTGGTGTGTT  
TGCCACAGCTTCTATCTGTTCTGTGTGTCTTTGGCCCTCAGAAGGCATCCAAACCC  
(SEQ ID NO: 35)
- 12840 GACTATTGCGAGTAGTCTTCTAAGTGGTCTTCTGGCTTGAGTTTCCCTGCTCTCAGATA  
AACTCTAATTTTGTCTCCAGATAAACTTTCTCAAATTTGAGTCTGTTTCTACTTTTGTGCG  
TGCAATAAATCTTCTCAGCATGCCCTTATTATTTTCAAGGAAAACTTAACTCATTTGGAC  
TGACACAAGATCTTCTGTAGTCTTCTGCTCAATCTTCTTAACTTTCTTAGCAATGCC  
CATATCTATCTATCTTATCTATCTATCTATCTATCTATCTATCTATCTATCTATCTATC  
[T, -]  
ATCATCTATCAATTTATCCATCATCTATACCCATCATGTCTGTGTCAAACCATATAACAAA  
TTATATTTTATCCCTTAACAGTACTATTTTAAATATTTTAAAAATCATCCATGCCCTCTTT  
TTCAAGGCTACTTTCTCCCTTGACTGTCTCTCAAAGTCTTCCAAACCTAACACACACG  
CACACACACACACACACACACACACACACACACATTTCTCTCTCACTCTGCTCAC  
CTGGTCTATTTGCTCTCTAGACTGGTAAATACTAGTTCTCTGGGCTCTCATGGTCTGTGT  
(SEQ ID NO: 36)
- 12844 ATTGCGAGTAGTCTTCTAAGTGGTCTTCTGGCTTGAGTTTCCCTGCTCTCAGATAAACT  
CTAATTTGTCTCCAGATAAACTTTCTCAAATTTGAGTCTGTTTCTACTTTTGTGCGTGA  
TAAATCTTCTCAGCATGCCCTTATTATTTTCAAGGAAAACTTAACTCATTTGGACTGAC  
ACAAGATCTTCTGTCTAGTCTTCTGCTCAATCTTCTTAACTTTCTTAGCAATGCCATA  
TCTATCTATCTTATCTATCTATCTATCTATCTATCTATCTATCTATCTATCTATCTATC  
[A, -]  
TCTATCAATTTATCCATCATCTATACCCATCATGTCTGTGTCAAACCATATAACAAATTTAT  
ATTTATTTCCCTTAACAGTACTATTTTAAATATTTTAAAAATCATCCATGCCCTCTTTTCA  
CAGGCTACTTTCTCCCTTGACTGTCTCTCAAAGTCTTCCAAACCTAACACACACGACAC  
CACACACACACACACACACACACACACACATTTCTCTCTCACTCTGCTCACTGG  
TCTATTTGCTCTCTAGACTGGTAAATACTAGTTCTCTGGGCTCTCATGGTCTGTGTGT  
(SEQ ID NO: 37)
- 12847 GCAGTAGTCTTCTAAGTGGTCTTCTGGCTTGAGTTTCCCTGCTCTCAGATAAACTCTA  
ATTTGTCTCCAGATAAACTTTCTCAAATTTGAGTCTGTTTCTACTTTTGTGCGTGA  
AATTTCTCAGCATGCCCTTATTATTTTCAAGGAAAACTTAACTCATTTGGACTGACACA  
AGATCTTGTCTAGTCTTCTGCTCAATCTTTCTAACTTTCTTAGCAATGCCATATCT  
ATCTATCTTATCTATCTATCTATCTATCTATCTATCTATCTATCTATCTATCTATCTATC  
[T, -]  
ATCAATTTATCCATCATCTATACCCATCATGTCTGTGTCAAACCATATAACAAATTTATTT  
TATTTCCCTTAACAGTACTATTTTAAATATTTTAAAAATCATCCATGCCCTCTTTTCA  
GCTACTTTCTCCCTTGACTGTCTCTCAAAGTCTTCCAAACCTAACACACACGACACAC  
ACACACACACACACACACACACACACACATTTCTCTCTCACTCTGCTCACTGGTCT  
ATTGCTCTCTAGACTGGTAAATACTAGTTCTCTGGGCTCTCATGGTCTGTGTGTATC  
(SEQ ID NO: 38)
- 13019 CTGACACAAGATCTTCTGTAGTCTTCTGCTCAATCTTTCTAACTTTCTTAGCAATGC  
CCATATCTATCTATCTTATCTATCTATCTATCTATCTATCTATCTATCTATCTATCTAT

FIGURE 30



Docket No.: CL001010

Serial No.: 09/776,705

Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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- CTATCATCTATCAATTATCCATCATCTATACCTACATGTCCTGTGTCAAACCATAACA  
AATTATATTATTTCCCTAACAGTACTATTTTAATATTTTAAAAATCATCCATGCCCTC  
TTTTACAGGCTACTTTCTCCCTTGACTGTCTCTCAAAGTCTCCAACCTAACACACA  
[C, -]  
GCACACACACACACACACACACACACACACACACATTTTCTCTCTCACTCTGCTCA  
CCTGGTCTATTGCTCTCTAGACTGGTAAATACTAGTTCTCTGGGCTCTCATGGTCTG  
TTTGATCTAGTATGTTACTGTTTCTAAAGGATATTTAAAAACACTTGAGTAGAGAATA  
AGCTTTTGGAGTCTGATGGACCTGAATTTGAGTCTGTTTCTGTCACTATCTGTGAACCTG  
GGAAGATCACTGTACTCTCTTGTCTGATTTTTCATGTATAAAAAATTACCTTACAAAGGC  
(SEQ ID NO: 39)
- 13022 ACACAAGATCTTGGTCTAGTTCTTCTGCTCAATCTTTCTAAACTTTCTAGCAATGCCCA  
TATCTATCTATCTTTATCTATCTATCTATCTATCTATCTATCTATCTATCTATCTA  
TCATCTATCAATTTATCCATCATCTATACCTACATGTCCTGTGTCAAACCATAACAAAT  
TATATTTATTTCCCTAACAGTACTATTTTAATATTTTAAAAATCATCCATGCCCTCTTT  
TCACAGGCTACTTTCTCCCTTGACTGTCTCTCAAAGTCTCCAACCTAACACACACGC  
[A, G]  
CACACACACACACACACACACACACACACACACATTTTCTCTCTCACTCTGCTCACT  
GGTCTATTGCTCTCTAGACTGGTAAATACTAGTTCTCTGGGCTCTCATGGTCTGTTT  
GTATCTAGTATGTTACTGTTTCTAAAGGATATTTAAAAACACTTGAGTAGAGAATAAGC  
TTTTGGAGTCTGATGGACCTGAATTTGAGTCTGTTTCTGTCACTATCTGTGAACCTGGGA  
AGATCACTGTACTCTTGTCTGATTTTTCATGTATAAAAAATTACCTTACAAAGGCTAT  
(SEQ ID NO: 40)
- 13285 ACTGTCTCTCAAAGTCTCTCAACCTAACACACACGCACACACACACACACACACACA  
CACACACACACATTTTCTCTCTCACTCTGCTCACTGGTCTATGCTCTCTAGACTG  
GTAAATACTAGTTCTCTGGGCTCTCATGGTCTGTTTGATCTAGTATGTTACTGTTT  
CTAAAGGATATTTAAAAACACTTGAGTAGAGAATAAGCTTTTGGAGTCTGATGGACCTGA  
ATTTGAGTCTGTTTCTGTCACTATCTGTGAACCTGGGAAGATCACTGTACTCTTGTCT  
[G, A]  
ATTTTTCATGTATAAAAAATTACCTTACAAAGGCTATTGTGAGGATGAAATAAGGTAACA  
TATGGCACAATAATAGTGTCTGTATATGCTTCTCTCTCTCTCTCTCTCTCTCTCTCTCT  
TCCATGTCTCTGGAGTTGGCTGAATTTATTTTAAATAGGCATTTAAAAAATTATAAAAC  
AAATATATGATGATTGTGAAAACTAAAACACTGCATAAATATATAAATTACCAAGAAAA  
GTTTATGTCTAGTCTCTCAGAAATAACTACTCATAGGTTTCTCCCTATGCCATAATCAA  
(SEQ ID NO: 41)
- 14461 TATCGAGCATTTTATAGGATGGCTTATAGTTGGTCTAATTTAACAACIGAAATAACCAG  
GCATAAGCATATTTAACCTGGACTCAAGAGTTGAGTGGCAGCAGCTCAGCTGTGGTTC  
AAAGCATAGCCACTACTACGCTTCTAAACAATGGAATAAAGTATAAGCGGTCTCTCAGT  
CAAGCTCAGCAGGTAAGAGGGGTGACTTTAAGGGAGTAAGATGAAATATCTGTAACATC  
ACCCAGAAATAATGCTCTCACTTTGGTACTTTTATTTGATTAGTTGATATTGGCATAA  
[G, C]  
AGAAATCACTTGTAFTTCTCTATTTAACAACCTCTACATTTAGAACACTTAATTTCTCAA  
TCCCTTAAAAAATTAAACATTTACTGCAGATGTTTTCACATTAACAGATTAATGCTGGAT  
CATTTCTGAATTTTGAAGACCAAAACATGTTAACATCACTGACATCACTGAAAAACAGCAA  
TTAATAGCTGTAAACATGAATGGTACCTCAGCAAGCCAGCTAATCAGAAATATCTCTGT  
GTTCACTCTGTGAAGATTAGCTTTAGCCAGGCTTTTGCAGGATTAACCAAAATATG  
(SEQ ID NO: 42)
- 15464 TGAGTCTATTTTAACTGAATCTTTTGGCCATGTGTCAACAAATTAACGTTATCCTTCA  
CCAAATGGGTGGCTTTGAAAAGGCGTGATGCATAAATATTTACAGTTGTAGGCAAAAT  
GTAATGTTATGTATATGAATACATATCAATTTTTCAGGGAGAAGGCTTGTAGATTTCAT  
CAAGAAATCTTTACAGAGTAGATAATCATTCATGATCACTTACCTAGATGCTCATGA  
AATTTTGGCACTTTATATAATTCTTAGTTAGCCAAAAGGAGTAAGATGAAGAGGGGG  
[-, G]  
AAAAAAAACCTTTTGTGACAAAGATGGAGAGAAGCTGTCTCTGTGATTTCTTTATC  
AATCCAGGAAGCTTTGGTTTTGACAATAAGTGGTCTGAGACTTTGTGTACTCTCTCAGAT  
AGGTCCCGAGGACTAGATTGGTGGCCATCTGCAGAAAACAGAGGGGATATATTGACTC  
TGACATCTGCCCTTTGATCTGCTCTCTCAGCTGGCCATGGCTTTGTGTGCCAGAC  
TACTGCCCAAGTTATAGACACTAACACAGGCACACTGAGTATGGGCTATGTTGATTTATA  
(SEQ ID NO: 43)

FIGURE 3P



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- TCTATTTTAACTGAATCTTTTGGCCATGTGTCAACAAATTAACTTATCCCTTCAACAAA  
TGGGTGGGCTTGAAAAAGGCGTGATGCATAAATATTTACAGTTGTAGGCAAAATTTGTAAT  
GTATGTATATGAATACATATTCATTTTTCAGGGAGAAGGCTTGTAGATTTCATCAAGA  
AATCTTTCACAAGAGTAGATAATCATTCATGTATCATTACCTAGATGCTCATGAAATTT  
TGCCACTTTATATAATTCCTTAGTTAGCCAAAAGGAGAGTAAGATGAAGAGGGGGGAAAA  
[-,A]  
AAAAACTTCTTTGACAAAGATGGAGAGAAGCTGTCTCTTGTATTCTTTTATCAATCC  
AGGAAGCCTTTGGTTTGTACAATAAGTGGTCTGAGACTTTGTGTACTCTTCAGATAGGTC  
CCGGAGGACTAGATTGGTGGCCATCTGCAGAAAACAGAGGGGATATATTGACTCTGCAG  
ATCTGCCCTTTGATTCTGCCATCTCTCAGCTGGCCATGCCCTTTGTGTCCAGACTACTG  
CCCAAGTTATAGACACTAACACAGGCACACTGAGTATGGGCTATGTTGATTATATACTAA  
(SEQ ID NO: 44)
- 15545 AGGCGTGATGCATAAATATTTACAGTTGTAGGCAAAATTTGTAATGTTATGTATATGAATA  
CATATTCATTTTTCAGGGAGAAGGCTTGTAGATTTCATCAAGAAATCTTTCAACAAGAT  
AGATAATCATTCATGTATCATTACCTAGATGCTCATGAAATTTTGCCACTTTATATAAT  
TCCCTAGTTAGCCAAAAGGAGAGTAAGATGAAGAGGGGGGAAAAAAACTTCTTTGAC  
AAAGATGGAGAGAAGCTGTCTCTTGTATTCTTTTATCAATCCAGGAAGCCTTTGGTT  
[T,C]  
TGACAATAAGTGGTCTGAGACTTTGTGTACTCTTCAGATAGGTCCTGGAGGACTAGATTG  
GTGCCCATCTGCAGAAAACAGAGGGGATATATTGACTCTGCAGATCTGCCCTTTGATTCT  
TGCCATCTCTCAGCTGGCCATGCCCTTTGTGTCCAGACTACTGCCAAGTTATAGACAC  
TAACACAGGCACACTGAGTATGGGCTATGTTGATTATATACTAAATGAGGGCAGAACCTTA  
GAATGCGAGCTTCACTGTAAACTTTGGAGCAGGATTTAACACAGAATCAGCCCTGATACT  
(SEQ ID NO: 45)
- 16199 AGAAGTTGGAAGCAGTGCCAAATACACAATGACTTTTTTTTCCATTTGGGGATTAGATG  
TTCATCTTACATATCCAAATGTCAATACTTGCTTGCATGTGACTTCAGTACTGTCCACA  
CCATTAAGCTGTGCATTTTCCATTTTAGCAATGTCAAGCTACCTCTTTATCATTAATA  
TGAATACCTGAAGTAATCAGAGCATTCATGGGACTTGAAGAAAATACCTGGGTATGTCTT  
ATGCTCCCTCTGTGACATCAAGTCACTCATCTACTTGGTCTTTTCTGATTCTAATATCC  
[T,C]  
TGCTCTCACTTCTAGAGAATGGTACCTCAATGGCAACTACCTCATCATATTGTGTCTG  
TTGGAATTATCTTCCACTTTCCCTCCTTAAAAATTTAGGTAAAGATATTTCTAAGCTGG  
AAATATTTTATTTTATTTTCAATTTAAATAGGTAGCTAATTTGTAGATGCCATATTCA  
CCTTCCAAAATGCTTCTTCTAAGCTTCTAGGTTATCTTGGCTATACAGTGGATTCTCTCT  
TACCTGCATGGTGTTTTTTGTGTAGTGGTAAAGTATGTGATGACATGATCCTTGCAGGT  
(SEQ ID NO: 46)
- 16798 GTTGGTTAGCATGAGTTTTTTTGTGGCTAAATTAGTGTCTCATTTTGTTCAGGCACTTC  
ACTAATATGAAATAGTTCTGTATCAAGTGATTTCTTGTAGACTAATTTAGAGCAAA  
AAAAGAGCAGCTACGATTTAAAGATAGTTGAGGTAGAATATCAAAGCTACTACTAATGGT  
TTGGTCTAGGCACTGGTTATATATGGGAAAAAGGAAACTTCAAGCAGGAACATGA  
CAATATCTTGGCATTTAGAACAGCAGAGGAGTCCAGATGAGAAACAGAAGGCTATA  
[T,C]  
CCATATTACATGAATCAGCCATCTCTCTTACACATTCACCCATTAAGAGAGGACAAG  
AACAGTGGGATTAAAGAGAAATCCTCCTCTCTAGGCCCTGACAAAAGAGGGAATTTCT  
TGCACTATCATGAATGCCAAAATTTATAAGCATTTCCCAAAGAGGTAAAGGAGAAGGA  
AAAAAGTTTGAAGACCATGTACCTTAGTTTGAAGAAATAAGGAAATGATCATCTTT  
CTCATGGAAGGGCATGAAGAGGGTGGGAAGGATCTTGCAAAATATTTGCTGTATTAAT  
(SEQ ID NO: 47)
- 18103 CATTTTAGCATTCATTTTGTCTTTGAAATTCIGCTCATATGTTCAAAGATTCTTTAACAG  
GAAACACAGTTTATAGCTTCTCTTCAGAGAAAATATGTACTCCATCCACTCCTCAGTAA  
CATGCTTTAATCAGAAAGGTGGGAATCAGCCACCAAGCACTACCTTATCTTCTTCTCT  
TCCCTTCTCTCCACCATTAATGGTTCAAGGGAGGGGTTATGGCAGGTGGACAAGGATCG  
ATGGTTGTAATAATTTTGGCAGGTGTGGGAATTTAAATTTGAATTTTGTTCGGAAGAAA  
[C,T]  
GATGTACGCTGGACTAGAAATGAAAACACCCATGACGACCAAACTTATGGTTAGGGGCA  
GCTCGATAAGCCAGTATGTCTTATAGTCAGCACCTAACCTTGTCTAGAACACATT  
CATTTACAAGAGATGTGTCAATATCTGTCTTGTGTCTTATTTGTACAAATAGAGTCACT  
GGCTAGAAAATCTGTCTTCTTCCAGCTGATGGTCTATGGTTTCAATTTGTATCTTTTCCCT  
TTGAAGTTGTGATATTGTCTTGGGAACAAAGGATATGAACCTATTATAGCTGTTTCCCT

FIGURE 3Q



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(SEQ ID NO: 48)

18421 AAATGAAAACACCCATGACGACCAAACTTATGGTTAGGGGCAGCCTCGATAAGCCAGTG  
ATGTCATTATATAGTCAGCACCTAACCCCTTGCTCTAGAACACATTTCATTACAAGAGATGTGT  
CAATATCTGTCCCTTTGTTGTCTTATTTGTACAATAGAGTCACTGGCTAGAAAATCTTGTT  
TCTTCCAGCTGATGGTCTATGGTTCATTGTATCTCTTTCCCTTTGAAGTTGTTGATATT  
TGCTTTGGGAACAAAGGATATGAACATATATAGCTGTTTTCTCTTTCCCTTTAAGGGAGG  
[A, G]  
TATTATATAATAATTCTCAACTTCTTTAATCTAGACATCAGTAACCTCAGTCTTCATTCT  
CACTAAATAGCAAAACTTTCCCATAAATTCGATTTACCTCATAAAAAATTCAGAACA  
CTTTCAAGTATTTTGATGTCTTTGATTTACTTTGAAAATTACATGTAGCAGTTACTCCAG  
AAGCCTGACAAITGATCTTTGGCAGCCAGGTTCCCTCTAGAATGGTTTTCAGAAGCTTTT  
CAGGTAGTCTGGACTCTGGCAGTAGTACTTTGCTGACTCTACTAGGTTCTTTTCTCAT  
(SEQ ID NO: 49)

18528 ACAAGAGATGTGTCAATATCTGTCCCTTTGTTGTCTTATTTGTACAATAGAGTCACTGGCT  
AGAAAATCTGTCTTCTCCAGCTGATGGTCTATGGTTCATTGTATCTTTTCCCTTTGA  
AGTTGTGTATTTTGTCTGGGAACAAAGGATATGAACATATATAGCTGTTTTCTCTTT  
CCTTTAAGGGAGATATTATATAATAATTCTCAACTTCTTTAATCTAGACATCAGTAACC  
TCAGTCTTCACTCTCACTAAATAGCAAACTTTCCCATAAATTCGATTTACCTCATAA  
[G, A]  
AAATTTCAAGACACTTTCAAGTATTTTGATGTCTTTGATTTACTTTGAAAATTACATGTA  
GCAGTTACTCCAGAACCTTGACAAITGATCTTTGGCAGCCAGGTTCCCTCTAGAATGGTT  
TTCAGAAGCTTTTCCAGGTAGTCTGGACTCTGGCAGTAGTACTTTGCTGACTCTACTAGG  
TTCTTTTCTCATTTTAAAGTCATCTCATTTATGAAATGCAAAAGCTTTCTATGTTAGGAGC  
CTGTTTCTCATCTTTATGTTAATTATATCTTTATTCAGTGGGCAAGCTTACTGACCTACGTC  
(SEQ ID NO: 50)

18722 TATTATATAATAATTCTCAACTTCTTTAATCTAGACATCAGTAACCTCAGTCTTCATTCT  
CACTAAATAGCAAACTTTCCCATAAATTCGATTTACCTCATAAAAAATTCAGAACA  
CTTTCAAGTATTTTGATGTCTTTGATTTACTTTGAAAATTACATGTAGCAGTTACTCCAG  
AAGCCTGACAAITGATCTTTGGCAGCCAGGTTCCCTCTAGAATGGTTTTCAGAAGCTTTT  
CAGGTAGTCTGGACTCTGGCAGTAGTACTTTGCTGACTCTACTAGGTTCTTTTCTCAT  
[T, C]  
TAAAGTCATCTCATTTATGAAATGCAAAAGCTTTCTATGTTAGGAGCCTGTTTCATCTTTA  
TGTTAATTATATCTTTATTCAGTGGGCAAGCTTACTGACCTACGTTGAAATAGACGTCTCC  
TCTTCTAGGGAATGATTTGTTTTAAGACTGAAGGACTAGTGTTTAAGAAAAATGGAAT  
GAATCCTCATTTAGCTCTCTAAGACAAATTTAAATCAGCTATAAGTTTATGTACTAAATAT  
GTCTTCATGATTAGCAATATAGATATACITTTTTTATTATTATTTTCATTTTGAAGGIGA  
(SEQ ID NO: 51)

18775 TCATTCTCACTAAATAGCAAACTTTCCCATAAATTCGATTTACCTCATAAAAAATTT  
CAGAACACTTTCAAGTATTTTGATGTCTTTGATTTACTTTGAAAATTACATGTAGCAGTT  
ACTCCAGAGCCCTGACAAITGATCTTTGGCAGCCAGGTTCCCTCTAGAATGGTTTTCAGA  
AGCTTTTCCAGGTAGTCTGGACTCTGGCAGTAGTACTTTGCTGACTCTACTAGGTTCTTT  
TCTCATTTTAAAGTCATCTCATTTATGAAATGCAAAAGCTTTCTATGTTAGGAGCCTGTTT  
[C, G]  
ATCTTTATGTTAATTATATCTTTATTCAGTGGGCAAGCTTACTGACCTACGTTGAAATAGA  
CTGTCTCTCTCTAGGGAATGATTTGTTTTAAGACTGAAGGACTAGTGTTTAAGAAAAA  
TGGAATGAATCCTCATTTAGCTCTCTAAGACAAATTTAAATCAGCTATAAGTTTATGTAC  
TAAATATGTCTTCATGATTAGCAATATAGATATACITTTTTTATTATTATTTTCATTTTGA  
AAAGTGAITTTTTTTTGTAGTTTAAAAACAAGCTTTGGTGTCTTTCTTTTCCAGTC  
(SEQ ID NO: 52)

18951 CAGAAGCTTTTCCAGGTAGTCTGGACTCTGGCAGTAGTACTTTGCTGACTCTACTAGGTT  
CTTTTCTCATTTTAAAGTCATCTCATTTATGAAATGCAAAAGCTTTCTATGTTAGGAGCCT  
GTTTCATCTTTATGTTAATTATATCTTTATTCAGTGGGCAAGCTTACTGACCTACGTTGAA  
ATAGACTGTCTCTCTAGGGAATGATTTGTTTTAAGACTGAAGGACTAGTGTTTAAG  
AAAAATGGAATGAATCCTCATTTAGCTCTCTAAGACAAATTTAAATCAGCTATAAGTTTA  
[T, C]  
GTACTAAATATGTCTTCATGATTAGCAATATAGATATACITTTTTTATTATTATTTTCATT  
TTGAAAGTGAITTTTTTTTGTAGTTTAAAAACAAGCTTTGGTGTCTTTCTTTTCTCTTCC  
AGTCGGTCCCGAGAAAAATGCAACGGTGTCAAATATTTCCATCACGGGATGCTTGTCT

FIGURE 3R





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- (SEQ ID NO: 53)
- 18974 ACTCCCTGGCAGTAGTACTTTGCTGACTCTACTAGGTTCCTTTCTCATTAAAGTCATCT  
CATTATGAAATGCAAAAGCTTTCTATGTTAGGAGCCTGTTTCATCTTTATGTTAATTATA  
TTCTTATTTCAGTGGCAAGCTTACTGACCTACGTGAATAGACTGTTCTCTTTCTAGGGA  
AATGATGTGTTTTTAAGACTGAAGGACTAGTGTTTAAGAAAAATGAAATGAATCCTCATT  
AGCTCTCTAAGACAAATTTAAATCAGCTATAAGTTTATGTACTAAATATGTCTTCATGAT  
[T, G]  
AGCAATATAGATATACITTTTTTATTATTATTTTCATTTTGAAAAGTGATTTTTTTTGTGA  
AGTTTAAAAACAAAGCTTGGTGTTCCTTTTTCAGTGGTCCCGGAGAAAAATGCA  
AACGGTGTCAAATATTTCCATCACGGGATGCTTGTTCATGTACCTGCTTGGCGCCCTCTT  
TGGTTACCTTAACCTTCCTATGTTAGGTCACTCTGAAAGTCATTCCTATATGCAAAATCCTT  
GTAGGCTGGTCTTGACCTGGGTAGGTATGATTTTTTAAAAATTGCCCTTCATATAAGCATG  
(SEQ ID NO: 54)
- 19540 GGTATGATTTTTTAAAAATTGCCCTTCATATAAGCATGCTCTATAGATGACACATATTCAATT  
AATATACTATTTTAGTTTTGTCACTTGACCTGAGGAAATGGGGCTGATTCAGCCTGGCT  
AACAAAGTTACAAAGATTTGTGAATTAACACCTATTTTATAAAAAATATCCCTCAAACAAA  
ATTATTTTCTCTAGGGATAGATGATTTTCTCTGGCTAGACTCCATAGTCCAACCTCAGG  
CTACAAGTGATGAGAATGAATCCACTTGCATGTGATAAAGCTCCTTTGATGGAATTATTA  
[A, C]  
CTGCCACACAAATAGCAGGAACTGCCAGGTCCCTCAAGTTTGAATTTGCCCTCCTCTTTA  
CCAGTCAAGTCAAATCTGGGAGCTTGGGACTTTAGGTAAAATTTCTGACATATCCCATTC  
TATTTTGTATATACTAAATGATTTTCTTAAGAAAGAGGACATGACAGAATTTCTTCAATCT  
AAGAATGCCACCACAAAAAAAGTACTATGGCCACATTAGATTATGCTGCAACATTTTC  
CTCTCTGGCATCTTAACAGTTTCAAAAGGAGTAGGATTTGACTCCTTCCATGAAGTGTG  
(SEQ ID NO: 55)
- 19841 CTGCCACACAAATAGCAGGAACTGCCAGGTCCCTCAAGTTTGAATTTGCCCTCCTCTTTA  
CCAGTCAAGTCAAATCTGGGAGCTTGGGACTTTAGGTAAAATTTCTGACATATCCCATTC  
TATTTTGTATATACTAAATGATTTTCTTAAGAAAGAGGACATGACAGAATTTCTTCAATCT  
AAGAATGCCACCACAAAAAAAGTACTATGGCCACATTAGATTATGCTGCAACATTTTC  
CTCTCTGGCATCTTAACAGTTTCAAAAGGAGTAGGATTTGACTCCTTCCATGAAGTGTG  
[G, A]  
CCACATAAACAGATTTTCATGGAATCACAATTTGACCTGGTAGCATATGTTTACATGAATC  
AGTGTATCAATATAAATATATTTTGTATAAACCTCCTTTTAAAGTTTAACTTAATTT  
TTTTCTTACTGACTTGGTAAATGAATTTGCATGTATGACAAATTTGGAGGAAAAGATTC  
AGGAGTAGGCCACCATTTGCTTAGGTTTTTTTCTATTTGACTAATATTTGACTATTAA  
CAACATGTGCTTTAGATTGGCATTAACITTTTTGCCGGTTGTGAATAATGAATGACGA  
(SEQ ID NO: 56)
- 20170 TATTGACCTGGTAGCATATGTTTACATGAATCAGTGTATCAATATAAATATATTTTGTGA  
TAAACCTCCTTTTAAAGTTTAACTTAATTTTCTTACTGACTTGGTAAATGAATTT  
GCATGTATGACAAATTTGGAGGAAAAGATTGAGGATAGGCCACCATTTGCTTAGGTTT  
TTTTCTATTTGACTAATATTTGACTATTAAACCAACATGTGCTTTAGATTGGCATTA  
CTTTTGGCGGTGTGAAATAATGAATGACGAGGTCAATACTACTGAAGGTATTTTCACT  
[A, C]  
CTTTTGTCTGATCTTGAGGTGAAAATCCAACTACGCTTGATTCATAGATATTTTCTTG  
TTATTTGTGCTTGGAGTCTGAATGAAGGTGTTTTCAAGTAGGGCTGCATCTTCGTCCTA  
GAGTAGTACCCACTGGGAGACCATCTAAAAATTATACTAATTTATCCCTGCACTGACTT  
ATACTTATTTTAAATGAGTTTCATAAGACAAGCAAAACTTGAAAGAGCCAAAAATATCT  
GTTTTAGTGTGGTGTAGGAGTCAATGTTGTAGCTTGAAAAATGGTAGCAATCATTTCA  
(SEQ ID NO: 57)
- 20343 TAGGTTTTTTTTCTATTTGACTAATATTTGACTATTAAACCAACATGTGCTTTAGATTGG  
GCATTAACTTTTTGGCGGTGTGTGAAATAATGAATGACGAGGTCAATACTACTGAAGGTAT  
TTTCACTACTTTTTGTCTGATCTTGAGGTGAAAATCCAACTACGCTTGATTCATAGATA  
TTTTCTGTATTTGTGCTTGGAGTCTGAATGAAGGTGTTTTCAAGTAGGGCTGCATCT  
TGCTCTTAGAGTAGTACCCACTGGGAGACCATCTAAAAATTATACTAATTTATCCCTGCA  
[T, C]  
GTACTTTATCTTATTTTAAATGAGTTTCATAAGACAAGCAAAACTTGAAAGAGCCCAAA

FIGURE 3S



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- AATATCTGTTTTAGTGTGGTGATGGAGTCATAGTTGTGAGCTTGAAAAATGGTAGCAA  
TCAITTCATCCTAGAGTTTACACACTGGGTTTGTAACTGCATCAGGAGTGGCTGCACAGG  
TAGGACAGGGGAGGTGGTAGGCTGGGAGAGACAATATGTGGGGCTTGGGTCTCTCATCC  
CCTTCAACAAGAGCACTTGGTCTCTGTCTGATTGTGAATTGCTTCTGTACAGCGAGAT  
(SEQ ID NO: 58)
- 20519 GATATTTTCTTGTATTTTGTGCTTGGAGTCTCTGAATGAAGGTGTTTTCAAGTAGGGCTGC  
ATCTTGTCTTACAGTAGTACCCACTGGGAGACCATCTAAAAATTATACTAATTTATCCC  
TGACGTTACTTATACTTATTTAATGAGTTTCATAAGACAAGCAAAAACCTTGAAAGAGC  
CCAAAAATATCTGTTTTAGTGTGGTGATGGAGTCATAGTTGTGAGCTTGAAAAATGGT  
AGCAATCATTCATCCTAGAGTTTACACACTGGGTTTGTAACTGCATCAGGAGTGGCTGC  
[G, A]  
CAGGTAGGGACAGGGGAGGTGGTAGGCTGGGAGAGACAATATGTGGGGCTTGGGTCTCTC  
ATCCCCCTTCAACAAGAGCACTTGGTCTCTGTCTGATTGTGAATTGCTTCTGTACAGCGG  
AGATAGATTATCACAATGTAAATGAGCTTGAGAGGCTCTTTATTTTGTATTATACCTTC  
TGCAACGTTATCAGCTTCAGGACCTCTTTGTTCATTGTAATGAAGGTGCATAGCTAATG  
AGCTCAGAGGCAAGACAGAGGTGCTTGGATTCCAGGCTAGGTCTTTCTCTGTCTCT  
(SEQ ID NO: 59)
- 20963 TGAGCTTGAGAGGCTCTTTATTTGTATTATACCTTCTGCAACGTTATCAGCTTCAGGAC  
CTCTTTGTTCATTTGAATGAAGGTGCTATAGCTAATGAGCTCAGAGGCAAGACCAGAGGT  
GCTTGGATTCCAGGCTAGGTCTTTCTCTGTCTGTGTCTCTCTATAAAATGTTGC  
CATAAGTGACCTGTGTGATTGTGACAACCAAGCGGTTTCATTCTCTTTTCTCTGTGT  
AGGAGAAGTTGAAGATGAATTACTTCATGCTACAGCAAGGTGTATACATTAGACATCCC  
[T, C]  
CTTCTCATGGTTTGGCTGGCAGTCTTGTGGCAGTAACACTAAGTGTGCCATTGTCTCT  
TTCCAGTAAGTACATAAGACTTTGATGAAAGAAACCTACTTGACCCCATAAATTAGTAC  
ATGTGTTCTACCTTCATTTTGAATTAATTATAGGGTGAGTTTGCAATTGCAATGCTGAG  
GATATATTTTCTATAGCATTTTGAGTCACTTAAATTTGGCCATTTAATGTGTAGATAG  
AGCAAGTAGTTTCAGGTGGTATTTTATAGTGTAGGAAAAAATCATAAACCTTATTTT  
(SEQ ID NO: 60)
- 21840 AAACAGTTATGCTATCTATCACAATCTCTCTCACACATGGGCTCTGCCAGACTCACACC  
AGGTCACCCCCTCCCTGGCATTGTGTCATTGGGTGTCAGTTGTTCGAGATCCAGAGCAGA  
GCTGTGTAGTGAAGATTGGGCTGTGTGAGTTAAACCAACCCTAAGGATAAACACAGGT  
CTTCACCCCTCCCTGCCAGCTCCGTGTTTATAAACACTGAATTTACTCATTCATTGTAGGGG  
GAAAAAATAAGTGACACAGTAACAGCACTGTCTGGACATAATGTTCCATACAGGGCT  
[G, T]  
GCATATGAAGACTATTTCTATAATGACACTGTGGTTCATTAAATGCAGCTTGTGTGCTG  
AAATATATTTTGGCACATTCCTTTTTCATGAGTGCATGAAATCAGATCCGTACTACTATG  
GTGGCTAATATTTTACTCTTAAATCATGTCTTGCTCTAATATATCTGAAGTATTTTCAG  
ATGACATACACATAGCTTTAGCCTAAATCAGCTCCGTCTTGGGTACAGACAGAGACA  
ACTATAAACAGAGGTATACGATAGGGTAAATTTGCCAGGCAACACTTCCTGAGAAA  
(SEQ ID NO: 61)
- 22783 TGAGAAATAAAGCACTGATATAAATCTGACCATCAGGAACAGCAATAGTGTGIAAACATT  
AGATGCCATTAGAACCAAAATTGACCATAAGAACAGAGTTTCAGAAAAATGACTAAGTGC  
TGTCCTTCATTATGTATTTCACCTCAACATAGCATTTATGAAACATTTTGACATTTATC  
CTGTCTCACCCTTGCAATGTTACATTTATATAATCTGTGTAAAGTGCTCCACTGCCCCAC  
AGAGTCATAAGTCCCTGGGACTTGGTGATGTGCACAGTGACTGGCACAGAGGGTGAGCTC  
[C, T]  
GTGTGTCTTGGGAAGAAAAATGGTCTTCAAAATGAATCTTGCTTGTCTTGAATGTATAA  
ACTGCTCTTTCTAGCAAAAGCATAGACACTCTTTCCCTTGGTGACATGTGCTACGAATTC  
AGCTGGGTGAGGATCTGGGCTAAATGAACCAACCTCCCTATACATGAAGGATACACAG  
AGATGGTGACAGAGAGTGGTCACTTCCGTGAGTGGATCTCAATCAAGTCTCTGAAGCTA  
AATTCATTTTCTTTTCTTACTAAAATGATAAAAGTTGTATTGGCGCTTTTGGTGTGTT  
(SEQ ID NO: 62)
- 22787 AAATAAAGCACTGATATAAATCTGACCATCAGGAACAGCAATAGTGTGIAAACATTAGAT  
GCCATTAGAACCAAAATTGACCATAAGAACAGAGTTTCAGAAAAATGACTAAGTGCCTGC  
CTTCATTATGTATTTCCTCAACATAGCATTTATGAAACATTTTGACATTTATCCTGT  
CCTCACCTTGCATGTACATTTATATAATCTGTGTAAAGTGCTCCACTGCCCCACAGAG  
TCATAAGTCCCTGGGACTTGGTGATGTGCACAGTGACTGGCACAGAGGGTGAGCTCTGTC

FIGURE 3T



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Inventor: Karl GUEGLER et al.

Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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- [G, A]  
TGCTTGGGAAGAAAAATGGTCTTCAAATGAATCTTGGCTTGTCTTGAATGTATAAACTG  
CCTTTTCTAGCAAAAGCATAGACACTCTTCCCTTGGTGACATGTGCTAGCAATTCAGCT  
GGGTTGAGGATCTGGGCTAAATGAACCAACCTCCCTATACATGAAGGATACACAGAGAT  
GGTGACAGAGATGGTCACTTCGGTGAGTGGATCTCAATCAAGTCTCTGAAGCTAAATTT  
CAATTTTTTTTCTTTACTAAAATGATAAAAGTTGTTATTTGGCGCTTTTGCTTGTATTATTT  
(SEQ ID NO: 63)
- 22825 CAATAGTGTGTAAACATTAGATGCCATTAGAACCAAAATTGACCATAAGAACCAGAGTTTC  
AGAAAAATGACTAAGTCTGTCTTCAATTATGTATTTCCACTCAACATTAGCATTATGA  
AACATTTTGCACATTATCCCTGTCTCACCCTTGCAATGTACATTTATATAATCTGTGTA  
AGTGCTCCACTGCCCCACAGAGTCATAAGTCCCTGGGACTTTGGTGATGTGCACAGTGACT  
GGCACAGAGGGTGAGCTCTGTCTGTCTTGGGAAGAAAAATGGTCTTCAATGAATCTTGC  
[T, C]  
TTGTCTTGAATGTATAAACTGCCCTTTTCTAGCAAAAGCATAGACACTCTTCCCTTGGT  
GACATGTGTACGAATTCAGCTGGGTTGAGGATCTGGCTAAATGAACCAACCTCCCTA  
TACATGAAGGATACACAGAGATGGTGACAGAGATGGTCACTTCGGTGAGTGGATCTCAA  
TCAAGTCCCTCTGAAGCTAAATTCATTTTTTTTCTTTACTAAAATGATAAAAGTTGTTAT  
TTGGCGCTTTTGCTTGTATTATTTGGTATAACTTAGGGCTCAGATTTTCAATGTGTCAAATG  
(SEQ ID NO: 64)
- 22967 CCTCACCCTTGCAATGTACATTTATATAATCTGTGTAAAGTCTCCACTGCCCCACAGAG  
TCATAAGTCCCTGGGACTTTGGTGATGTGCACAGTGACTGGCACAGAGGGTGAGCTCTGTCT  
GTGCTTGGGAAGAAAAATGGTCTTCAAATGAATCTTGCCTTGTCTTGAATGTATAAACT  
GCCCTTTCTAGCAAAAGCATAGACACTCTTCCCTTGGTGACATGTGTACGAATTCAGC  
TGGGTTGAGGATCTGGGCTAAATGAACCAACCTCCCTATACATGAAGGATACACAGAGA  
[A, T]  
GGTGACAGAGATGGTCACTTCGGTGAGTGGATCTCAATCAAGTCTCTGAAGCTAAATTT  
CAATTTTTTTTCTTTACTAAAATGATAAAAGTTGTTATTTGGCGCTTTTGCTTGTATTATTT  
CGTATAACTTAGGGCTCAGATTTTCAATGTGTCAAATGCTGACTCACAGCATGGTTCTCC  
TGACAGTTTATTTTCAATTTAAGGAACCTCTCACCAGTAAGTTTATTTACTTGGCTTGATAT  
CTCCACACATTAAATAATAAACTAACAAAACCTAATCTGAATTAAGTATATCAGCTTTTA  
(SEQ ID NO: 65)
- 23248 CATGAAGGATACACAGAGATGGTGACAGAGATGGTCACTTCGGTGAGTGGATCTCAATC  
AAGTCTCTGAAGCTAAATTCATTTTTTTTCTTTACTAAAATGATAAAAGTTGTTATTTG  
GGCTTTTGCTTGTATTATTTCTGATAACTTAGGGCTCAGATTTTCAATGTGTCAAATGCT  
GACTCACAGCATGGTTCTCCCTGACAGTTTATTTTCAATTAAGGAACCTCTCACCAGTAAGT  
TTATTTACTTGGCTTGATATCTCCACACATTAAATAATAAACTAACAAAACCTAATCTGA  
[A, G]  
TTAAAATCTATCAGCTTTAGGCATTTATTTTGTGTCTCTCTTTCAACATGGTAACTGG  
GCTCTCTTTCTTAGGAGCTTGAGAAGATATGACTGGGGTTTGTTTTTCTCTACTTCATTT  
ATTATCTTTCTTTTTTCCAAATCAGGTTAGTTTTTCTTTTGTAGTAAAGGTGCATAGTA  
ACTGCTTTGTAGTATTTGTGAACAAGTGAATAAATGAAATGAATTAAGGTAGTGTTTTCA  
CTAGCAGCCCAACATTTCTTTCTCTTTAGTAGTGGGTGGGTATCAGTTATGGAATGGC  
(SEQ ID NO: 66)
- 23764 GAAATGAATTAAGGTAGTGTTTTCACTAGCAGCCCAACATTTCTTTCTCTTTAGTAGTG  
GGTGGGGTATCAGTTATGGAATGGCACTCCCTCCAGAGGACTGATCATGTCAATTTTCAG  
CTTATGCTTTCCCTTTATGCAAGTAAAGTTTCCATATTTCCATAAAGAACAAGAAACCAAT  
AATCCTAATGGATATATAATGAACACACAGATGAAAAATTCACCTGCCATGGCTTTGAAA  
AAAGATCCCTAGCTACTTGTATTTTCACTTTATAATTAATTAATCAGTCTTTTCACTTATGTT  
[G, T]  
TCTTCAGATCTCCTGTTTTGAAGTGATATAGATATCAACATAGAATGCAGGGTATATT  
GCTATCAACTGCAGTGGAGCAGTGATTTGTAGGTTTTTCCAACTCCTTGCCTTAAGCAAA  
CCTGCAAAATCAAGTTGTGAGCTACGCTTAAACAATGGGAGAGGCTTTTTTTTTTTTTTT  
AAGAGTTAGAATAAGACTCTCACTTCTCTCTGTGCTCCACATTTTTGACCTTCACATT  
GGGCCCCTGATCAGAATACAGCACCCCTAACAGGCTCCTGTTTCAAGGACTCTTTCTCTG  
(SEQ ID NO: 67)
- 23765 AAATGAATTAAGGTAGTGTTTTCACTAGCAGCCCAACATTTCTTTCTCTTTAGTAGTGG  
GTGGGGTATCAGTTATGGAATGGCACTCCCTCCAGAGGACTGATCATGTCAATTTTCAGC  
TTATGCTTCCCTTTATGCAAGTAAAGTTTCCATATTTCCATAAAGAACAAGAAACCAATA

FIGURE 3U



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Inventor: Karl GUEGLER et al.  
Title: ISOLATED HUMAN TRANSPORTER PROTEINS...

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- ATCCTAATGGATATATAATGAACACACAGATGAAAATTTCACCTGCCATGCCCTTTGAAAA  
AAGATCCCTAGCTACTTGTATTTTCATCTTATAATTAAATCAGTCTTTTCACTTATGTTT  
[C, T]  
CTTCAGATCTCCCTGTTTTGAAGTGTATATAGATATCAACATAGAAATGCGGCTATATTG  
CTATCAACTGCGAGTGGAGCAGTGATTCTGTAGGTTTTCACACATCCCTTGCCCTAAGCAAAC  
CTGCAAAATCAAAGTGTGAGCTACGCTAAACAATGGGAGAGGCTTTTTTTTTTTTTTA  
AGAGTTAGAACTAAGACTCTCACTTCTCTCTGTGCCCTCCACATTTTGGACCTTCACATTG  
GGCCCCGTGATCAGAAATACAGCACCCCTAACAGGCTCTGTTCAGGACTCTTTCTCTGG  
(SEQ ID NO: 68)
- 24432 GGATGGTGTGGGGAACCTCCCTGACCCACAGCATCTGACCCACATTTCCAGGTTCCTAGC  
GACTTGTGTGAGTAAAGAAAAAGGCACATAGCTAAGTGAAGAGCAGATGAGGCTTGGTG  
GGAATCAGCCAGTGGTCTGCTGCTAGCAAAGGTAAACAGAACTGCTGGGGCTTTTGGTCC  
TAGGCTCACTACTCAGGGAGGCACTTTAACATGGAATGACCAGCAAGTTTCTCTCTGAT  
CTTTTCCACACCACCACAAGCCTAGTACCTCCCTCCCTCTTTGCTCTGTGTCTCTCTTC  
[A, G]  
GGAATGCCTGGAACACCTTCAGTCTCTGTGTGGAAATTTTCTTATTCCTTATTCAGAAA  
GAGGAAGAAGCTTTTGCTTTTACTCCACCGTTCTACCTTATTTCCATAAATTTCTG  
TGATCTCATATCATTAGGCCAAATGTTAATCTTTCTGGGAGCCAGGAGACTGCTTTTACA  
TTCTCAGGCGCTTGCATATAGGACTGCTCTAAGTCACTCTAAGTCAAGCTTATTGACTT  
GAATGCACCTTTTAAACAAGTGAATAAAAAACAACCTGTGACTATTTCTCTGAAATGAGC  
(SEQ ID NO: 69)
- 24538 GATGAGGCTTGGTGGGAATCAGCCAGTGGTCTGCTGCTAGCAAAGGTAAACAGAACTGCTG  
GGGCTTTTGGTCTAGGCTCACTACTCAGGGAGGCACTTTAACATGGAATGACCGACAA  
GTTTCTCTCTGATCTTTTCCACCAACCACCAAGCCTAGTACCTCCCTCCCTCTTTGCT  
CTGTGCTCTCTTTGGGAATGCACTGGAAACACCTTCAGTCTGTGTGGAAATTTTCTTA  
TTCTTTATTCAGAAAGAGGAAGAAGCTTTTGCATTTACTCCAACCGTTCTACCTATTATT  
[C, G]  
CCATAAACTTTCTGTGATCTCATATCATTAGGCCAAATGTTAATCTTTCTGGGAGCCAGG  
AGACTGCTTTTCATTTCAAGGCGCTGGACATATAGGACTGCTCTAAGTCACTCTAAGT  
CAGCTTATTTGACTTGAATGCACCTTTTAAACAAGTGAATAAAAAACAACCTGTGACTATT  
CTCTGAAATGAGCCTATATCTCATACCTTATTTATTTCTGTTTAACAAGTGTGAAACAAAT  
AAGTCTCTGGCACTATGTATATACCAATAAAAGCTTATTTGTAAGCCTACTAATTTGGAC  
(SEQ ID NO: 70)
- 24693 CCTAGTACCTCCCTCCCTCTTTTGTCTGTGTCTCTTTGGGAATGCACTGGAAACACC  
TTCACTTCTGTGTGGAAATTTTCTTATTCCTTATTCAGAAAGAGGAAGAAGCTTTTGCATT  
TCTCAGAACCGCTTCTACCTATTATTCCCATAACTTTCTGTGATCTCATATCATTAGGCC  
AAATGTTAATCTTTCTGGGAGCCAGGAGACTGCTTTCACTTCAGAGGCGCTGGACATAT  
AGGACTGCTCTAAGTCACTCTAAGTCACTTATTTGACTTGAATGCACCTTTTAAACAAG  
[T, C]  
GACTAAAAACAACCTGTGACTATTCTCTGAAATGAGCCTATATCTCATACCTTATTTAT  
TCTGTTTAAGCTGTGAAACAATTAAGTCTCTGGCACTATGTATATACCAATAAAAGC  
TTATTTGTAAAGCCTACTAATTTGGACCAAGTTTGTACAATATTGAATAAGCACTAATTTGCAG  
ATCATAATGTAGAATTATAGGCTGCTGAGGAAACAATATCACACCTTTTGTCTTCTCTCA  
GTTTCTCTTTTCAAGTGAATTTTCAATGTTTCACTAATCCAATTTTAAATCTTTTACA  
(SEQ ID NO: 71)
- 24819 AACCGTCTACCTATTATTCCCATAACTTTCTGTGATCTCATATCATTAGGCCAAATGT  
TAATCTTTCTGGGAGCCAGGAGACTGCTTTCACTTCAGAGGCGCTGGACATATAGGACT  
GCTCTAAGTCACTCTAAGTCACTTATTTGACTTGAATGCACCTTTTAAACAAGTGAATA  
AAAAACAACCTGTGACTATTCTCTGAAATGAGCCTATATCTCATACCTTATTTATTTCTGT  
TTAAGCACTGTGAAACAATTAAGTCTCTGGCACTATGTATATACCAATAAAAGCTTATT  
[C, T]  
GTAGCCTACTAATTTGACCAAGTTTGTACAATATTGAATAAGCACTAATTTGCAGATCATA  
ATGTAGAATTATAGGCTGCTGAGGAAACAATATCACACCTTTTGTCTTCTCTGAGTTTCC  
TTTTTCAAGTGAATTTTCAATGTTTCACTAATCCAATTTTAAATCTTTTAAACAAGTTA  
TTCTTAAACTATTTCAGAGACTATCTGTTTGTCTCTTCAAGTGAATTTGCTTTTCTC  
AGCCTAAACAGATGGCTTAAATTTTGGTGGAGTGGTATGAAAGGAATGTACATGAGAA  
(SEQ ID NO: 72)
- 25743 TATCCAGTTACAGCAGCGTAACCTGAGCAGCTGCTGCAAACTGAGGCTCTCTTGACCCCT

FIGURE 3V



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CGOCTACTTATTTTCAGCTGCTAAAATAGGGCTGAAATCIGTCAAGGATCCTGAAGGGAAG  
GATAAGATTCTTACTATTCAATTTAATTTAAGCTTTTATTCAGTGCTGCTGCTGTCACA  
ACACTAAGCTAGAAAGCTGAGGAATGTTTAGATTATTAGGTCTGTTCTTGGCTTTCA  
TAGATTTCAATCTATTGATAGGAGAGCTAAAAAGGAGAGAAAGAGGAGGACCAACA  
[C, T]  
AAAAAGCTCAAAATTTTAAAATACCATTTTAAAATTTTATTTTAAAATGTTAAATACCAT  
GCAAAATTAAGGAAAACCTAGATTTCATAAAAATTCCTTTTCAATCTTGTGTAAATCAAT  
TCAGTGCTTGCCCTTAATGTCTCATCCAGTCTGATGAGACATGTTTGTGATCAACAAGG  
GTTTACTATGTTTCTAATTTATGTGCTTGCCGTGTTATCTCTTCTGACCGAGATTATT  
TTTAAACAATAAATCTGAAAACCTAAGAAAGTGAAAGCATAAAATATTGTCTTATAAAATA  
(SEQ ID NO: 73)

26044 AAAAAGCTCAAAATTTTAAAATACCATTTTAAAATTTTATTTTAAAATGTTAAATACCAT  
GCAAAATTAAGGAAAACCTAGATTTCATAAAAATTCCTTTTCAATCTTGTGTAAATCAAT  
TCAGTGCTTGCCCTTAATGTCTCATCCAGTCTGATGAGACATGTTTGTGATCAACAAGG  
GTTTACTATGTTTCTAATTTATGTGCTTGCCGTGTTATCTCTTCTGACCGAGATTATT  
TTTAAACAATAAATCTGAAAACCTAAGAAAGTGAAAGCATAAAATATTGTCTTATAAAATA  
[G, C]  
GCCAAGTAAAAATGACACTCCATTTCAAATATCAAAAGTTAGCATCAAGACTGCACAAG  
ATGAATGTACAGTCATGTGTGCTTACAAATGTGGACATAFTCTGAGAAATGCATCTTTA  
GGCAATTTTGTCTATTGTGCAACACCATAGATTGTACTTGCAGCCTAATTGGTGGAGCCT  
ACTATACACTAAGGCTATATGGCATAGCCTAGTACTCTAGGCTACAAACCTGTACAGCA  
TGTTACTGTACTGAATAGTGGAGTACCTGTAAACATAATGGTAAGTATTGTGTCTCCAA  
(SEQ ID NO: 74)

26555 AGTACTCTTAGGCTACAAACCTGTACAGCATGTTACTGTACTGAATAGTGGAGGTACCTG  
TAACATAATGGTAAGTATTGTGTCTCCAAACCTAGAAAAGCTACTGTAAAAATACAGTA  
TTACAACTTAGGGTATCACTGTCTTATATGTGGTCTGTGTGTGACCGAAATGACTATGC  
TTAATACCACCTGAACCTGTACACTTAAAAATGGTTAAGATGGTAAATTTCTATGTATGTAT  
GTTTATAATAATAAAAAAATTGAAAAAGCATCAACATCTTTCTGGGAAAAAGAAAA  
[G, A]  
GAAAGAAAAATGCATTAGAGTGTGAGAAATATTGAGTAATAGATAAAGTCAAAAAACAA  
GAAATGATCTTGCCCTTGAACCTTTCTTGTTTAAGATTGTACATCAGTGATCACACTGTT  
ATTTCCCAAACGACCTTTCAGCTGGATACGACATTTCTGATTGCGAGCTGTGCTTATTCG  
ACTTAATATGTTCTGGTATCCCTTGTGCCAACTATAAAATACATCTTCCGATTCATAGG  
TGAGTTTCAGAAAGGCTTCAATTTGGTCAACCCAACTCAGCCTCATTAATGATGGAC  
(SEQ ID NO: 75)

27886 GGTTTATTTAAAGTGTGTGCTGGCATCTCCTTTGCTAGGAACCTGCTGGGTAAGACATTGA  
CCTTGCCCTGTGTGTCTTCTCAGGGCTTCTTCTGCCACTATGCTGATTTTATTTCTT  
CCAGCAGTTTATTTATCTTAAACTTGTCAAGAAAGAACTTTTAGGTCAACCCAAAAGGTC  
GGGTAAGTAAACCTTGCAATTTCCCCATTTATAGTTGTTCTTCCAACTACTTGAATA  
AACTAGAAAAATACATAGTTTCAAAAAATGAATCAATGTACAGAACCAAAATCAAAA  
[A, C]  
TGGGCTAGAACTTTCTGGTAGCAGAGAAAGGGACATATTTCTGAAACTCAATGATTCT  
ACTTCAAATATCAAATATCTGTGTGTGAGTCTGTATACATGTCAAATAGTAGTAGCCTT  
TCCACAGACACATATGCTTCAGGCAATAGCAGTGTCCAATACCAAGCTGCTGTGTGTC  
TATCCGTGGAAATCATGCAAGAAGGAATTAGGCTCCCTAGCGGTGTTATGGAATAATT  
AAATATTTTGGTATGTTTGTAGGTTTGCAGGCAAGGCAAGGATGTTGCTTTTGTTT  
(SEQ ID NO: 76)

31884 CTTTATGTTAGTTTGTAAAGAATCCATTGAAGATAGAAAATGAGAGAATAGAAGAAACC  
TGAGAATAGTAAATAAAGAGCAGAGAAAATATGGGGCAGGGAACATGTGAGTGCTA  
AGGATTGATTATGAATGAACGATTAGGGGGATTGATGGATCACAGGGTAAGTATATGCTT  
AACTTTATAAGAACTTCCACATAGTTTTCACAGTGTCTTACCATTTCATTTCCACC  
CGTACTACCTACACTTCCACTGACTCCACAGCCCTGCCAACATTTGGTGTGTCTTTTG  
[T, C]  
ATTTTAGCCCTTCTAGTGGGTCTGAAATGGTAACTCATGTGATTTTCATTTCTGCTTCT  
GTGCAACTAATGTTGAAACCTTTCAAGTGTTTAATGGTCACTCATATATCTCTTTTG  
TGAAGTGTGATTCAAATCTTTTGGCCATTTTAAAAATTTAGGTATGTGTTTATTTGG  
GTATTTGTAGAAAGCTCTTAAATATGGATCCATGTCCAGATTGCCAATATATTTTCCAG  
TCTATGGTATGTTGCTTATTTTCTTAAAGGTGTCTTAATTACATCTTTCTGGGGCCAGG  
(SEQ ID NO: 77)

FIGURE 3W



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TTTCATTTTCIGCTTCIGTGACAACTAATGTTGAAAACITTTCAAGTGTAAATGGTCACT  
CATATATCTTCTTTTGTGAAGTGTGATTCAAATCTTTTGCCATTTTAAAAATTTAGGT  
TATGTGTTTTTATTTGGGTATTTGTAGAAGCTCTTTAAATATGGATCCATGTCCAGATTGC  
CAATATAITTTTCCAGTCTATGGTATGGTTGCTTATTTTCTAAAGGTGTCTTAATTACA  
TCTTTCTGGGGCCAGGTACCATAGCTCAAAGTTTTGCAATTTATGTCTTAATGAGATAA  
[T,A]  
ATTAAATCAGAGTGGTATAGTCAAAATTAATGTTTTGATGTCTTGGGCCATATAGGTAG  
GACTGGATCATCTAACCAAGATGCAAAAAAAAAAAAAACAAAAACAAAAATAGTACTTIG  
GAAAAACTTATTTTAAATTAAACA  
(SEQ ID NO: 78)

FIGURE 3X